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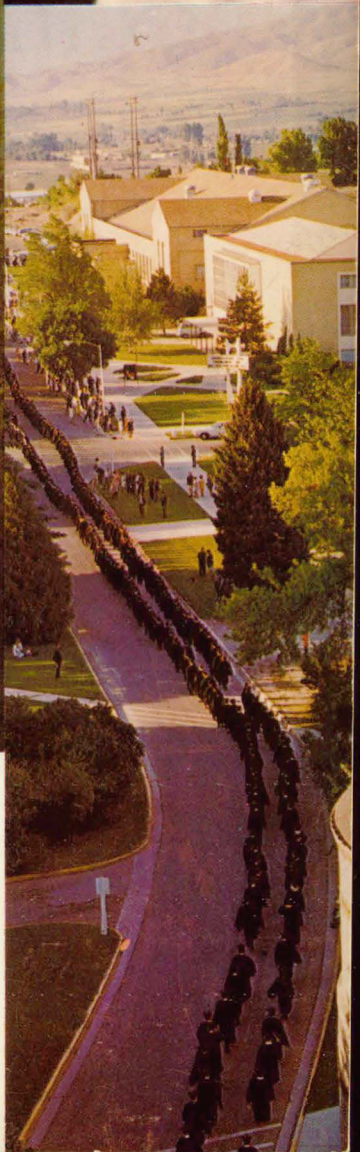
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UTAH STATE
UNIVERSITY

1970-72

GRADUATE BULLETIN

LOGAN, UTAH



UTAH STATE
UNIVERSITY

LOGAN, UTAH

1970-72

GRADUATE BULLETIN

ELDON J. GARDNER, Dean, School of Graduate Studies
Graduate Office, Main 132

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Utah State University

Utah State University offers a wide range of good living and learning experiences, where progress, growth, discovery, and enthusiasm all move in the same direction — toward the education of the student, his discovery of himself and his potential.

The University has a three-fold purpose: teaching, research, and extension. USU also cooperates with various agencies on a national and international level to help promote understanding and share knowledge.

With a studentbody of 9,000, Utah State has advantages of both the large and small schools, with such features as a spacious new library, excellent laboratories, and top-rated cultural attractions, including world-famous symphonies, ballets, pianists, singers, and lecturers. These advantages are combined with the close, personal attention given to students found at smaller schools.

This University was founded in 1888 as a part of the public educational system of Utah and operates under the constitution and laws of the state. It belongs to a great family of institutions known as land-grant universities, which had their origin in 1862. A rich curriculum is offered in the arts and sciences, in both undergraduate and graduate programs. Degrees granted include the Bachelor of Arts (BA), Bachelor of Science (BS), Master of Arts (MA), Master of Science (MS), several other Bachelor's and Master's degrees, Specialist in Educational Administration, Doctor of Education (EdD), and Doctor of Philosophy (PhD).

USU includes nine resident colleges with 53 departments, a School of Graduate Studies, Extension Services, and several research programs. There are also current programs in educational aid to several foreign countries.

USU is accredited by the Northwest Association of Secondary and Higher Schools, and is on the accepted list of the Association of American Universities, and of the American Association of University Women. It is a member of the American Council on Education and is listed by other accrediting agencies.

A fifteen-member State Board of Higher Education governs the Utah state system of higher education. This board has the responsibility for state-wide master planning for higher education, assignment of roles to the several institutions in the state system, and control of operating and capital budgets for the institutions. USU has a nine-member Institutional Council. This council has the responsibility of implementing the assigned roles, including the appointment of personnel and the enactment of rules and governing regulations.

Logan, Utah, home of Utah State University, is a town of 25,000 located in northern Utah, 80 miles north of Salt Lake City.

The campus has added several new buildings this year, including a seven-story Business building, a Chemistry building, a Physical Education building, and an Assembly Center.

1970

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Graduate Calendar

Summer Quarter 1970

June 15, Monday	Registration
June 16, Tuesday	Classes begin
July 17, Friday	End of first session
July 20, Monday	Second session begins
August 21, Friday	End of second session

Fall Quarter 1970

September 24, Thursday	Registration
September 25, Friday	Registration
September 28, Monday	Classes begin
November 26-27, Thurs., Fri.	Thanksgiving recess
December 11, Friday	Classes end
December 14-17, Mon.-Thurs.	Final examinations

Winter Quarter 1971

January 4, Monday	Registration
January 5, Tuesday	Classes begin
March 12, Friday	Classes end
March 15-18, Mon.-Thurs.	Final examinations

Spring Quarter 1971

March 22, Monday	Registration
March 23, Tuesday	Classes begin
May 28, Friday	Classes end
May 31, Monday	Memorial Day Holiday
June 1-4, Tues.-Fri.	Final examinations
June 4, Friday	Baccalaureate
June 5, Saturday	Commencement

Department Abbreviations Used in Class Listings

Acct—Accounting	History
AS—Aerospace Studies	HEcEd—Home Economics Education
Ag Ed—Agricultural Education	HEM—Household Economics and Management
AgIE—Agricultural and Irrigation Engineering	ITE—Industrial and Technical Education
An Sci—Animal Science	IM—Instructional Media
Ap St-CS—Applied Statistics - Computer Science	LAEP—Landscape Architecture and Environmental Planning
Art	Lang, Phil—Languages and Philosophy
Bact, PubH—Bacteriology, Public Health	Mfg Engrg—Manufacturing Engineering
Bot—Botany	Math—Mathematics
BA—Business Administration	Mech Engrg—Mechanical Engineering
BE, OA—Business Education and Office Administration	MS—Military Science
CD—Communicative Disorders	Music
Chem—Chemistry	Physics
Civil Engrg—Civil Engineering	Plant Sci—Plant Science
CT—Clothing and Textiles	Poli Sci—Political Science
Dairy—Dairy Science	Psych—Psychology
Econ—Economics	Range—Range Science
Ed Adm—Educational Administration	Sec Ed—Secondary Education
Elec Engrg—Electrical Engineering	Soc, SW, Anthr—Sociology, Social Work and Anthropology
Elem Ed—Elementary Education	Soils, Met—Soils and Meteorology
Engl, Jcurn—English and Journalism	Sp Ed—Special Education
FCD—Family and Child Development	Speech
FN—Food and Nutrition	Th Arts—Theatre Arts
FSI—Food Science and Industries	Vet—Veterinary Science
For Sci—Forest Science	Wildlife—Wildlife Resources
Geol—Geology	Zool—Zoology
HPER—Health, Physical Education and Recreation	

School of Graduate Studies

Eldon J. Gardner, PhD

Dean of the School of Graduate Studies; Professor of Zoology

Office in Main 132

The first Master of Science degree at USU was awarded in 1914, and the first Doctor of Philosophy degrees were awarded in 1950. The Graduate School was organized formally in 1945.

In the past ten years, graduate enrollment has increased from 7.2 percent of the total 1958-59 enrollment of 4,635 to 15 percent of the 1967-68 enrollment of 9,719. In the past eleven years (1959-69), USU has awarded 2,766 Master's degrees and 348 Doctor's degrees.

Purposes of the Graduate Program

The chief functions of graduate work are: 1) to train students for competence in creative activity and research that culminate in a contribution to knowledge, 2) to develop scholarship, including interpretation, organization, evaluation, and application of knowledge, and 3) to develop proficiency in the dissemination of knowledge. While the baccalaureate degree work helps the student to function intelligently in and contribute to the needs of a democratic society, graduate training is more specialized and provides the basis for increasing knowledge, which in turn should improve the everyday living of mankind.

Graduate Council

Graduate study is supervised by the Dean of the School of Graduate Studies, assisted by the Graduate Council. This council consists

of one representative from each of the nine resident colleges of the University and one from the Library.

Regulations and standards for graduate work are established by the Graduate Council with the approval of the Faculty Senate. Students and staff members should consult with the council representative of their college on questionable interpretations or exceptions to the rule. The Dean of the School of Graduate Studies will rule for, and with the advice of, the Graduate Council on all exceptions or adjustments.

Chairman: Eldon J. Gardner, PhD, University of California; Dean, School of Graduate Studies, ex-officio

Joseph C. Street, PhD, Oklahoma State University; College of Agriculture, 1970

Leonard J. Arrington, PhD, University of North Carolina; College of Business, 1973

Charles O. Ryan, EdD, University of Arizona; College of Education, 1973

Bruce O. Watkins, PhD, University of Minnesota; College of Engineering, 1973

Jay D. Schvaneveldt, PhD, Florida State University; College of Family Life, 1972

Jay R. Jensen, PhD, University of Wisconsin; College of Humanities and Arts, 1971

(list continued on next page)

John M. Neuhold, PhD, Utah State University; College of Natural Resources, 1970

Keith L. Dixon, PhD, University of California; College of Science, 1971

Therel R. Black, PhD, University of Wisconsin; College of Social Sciences, 1972

Milton C. Abrams, PhD, University of Utah; Librarian, ex-officio

University Library

Interlibrary Loans. The practice of Interlibrary Loans has long been recognized as a necessary adjunct to the more direct service functions of the USU Library to graduate students. Such loans supplement the library's resources by making available for research materials located in other libraries and not owned or available for purchase by the borrowing library.

Interlibrary Loan service is a courtesy and a privilege, not a right, and is dependent upon the cooperation of many libraries. Because of the cost to the library of the service (estimated at five dollars per item) and the conflict in demands for certain classes of materials, the Interlibrary Loan Service is restricted to requests that cannot be filled by any other means. If you wish to use this service, contact Ida Marie Jensen at the USU Library.

Before an Interlibrary Loan is requested, an awareness of the following points is essential:

- 1) Many of the titles requested involve complex entries and foreign languages which must be verified and complete before a request can be forwarded to any other library.

- 2) Libraries are reluctant to loan periodicals and have arrangements for making photocopies which must be purchased. As the charge is ascertained per page, total and

exact pagination of an article must be known.

- 3) After a request is mailed, sufficient time must be allowed to locate the book if the request is placed through the Bibliographical Center (this is necessary except in the case of theses, which are borrowed directly from particular schools). Time is also required for the lending library to go through all the details of handling a book to be charged out to Interlibrary Loans, and additional time in the mails is required. Usually the entire process takes from ten days to two weeks. There are times, however, when a month or more is required.

- 4) The length of time a patron may keep the borrowed item is determined by the *lending* library.

- 5) If an extensive study is undertaken here at USU, it is required of the one doing the study to consult with the Reference Librarian as to details and extent of borrowing privileges that will be needed, as the expense may be excessive. The expense of each item is too high to permit a student beginning graduate work to borrow extensively merely to make a survey of what has been done.

- 6) Masters' theses are usually available through loan terms but doctoral dissertations must now be purchased on microfilm and be-

come the permanent property of the University Library.

Descriptors Aid Research. New IBM listings in the Library will make available an in-depth record of theses and dissertations by adding descriptors to the traditional author and title categories.

Graduate Study Carrels. Individual study carrels with lockers are located throughout the Library. Graduate students interested in being assigned one of these carrels may apply to one of the divisional librarians.

Visiting Scholar Program. A Visiting Scholar Program has been arranged between the institutions of higher education in Utah. Under its provisions graduate students may be issued a permit to do work in the libraries of the University of Utah, Brigham Young University, and Weber State College. A recommendation for such use is issued from the

office of the librarian permitting the student free use of library materials and limited borrowing privileges from other institutions. Recommendations are not issued until local resources have been exhausted and when interlibrary services are inadequate to meet the graduate's needs.

If registered graduate students or faculty members wish to use library facilities at Brigham Young University, Southern Utah State College, University of Utah, or Weber State College they should contact Ida Marie Jensen at the USU Library to obtain a visiting scholar permit card.

Graduate News and Comment

Graduate News and Comment is published quarterly by the School of Graduate Studies at USU. Its purpose is to provide news, information, views and opinions of interest to graduate students and faculty. Free copies are available.

Tuition and Other Fees

The University reserves the right to alter any of these charges without notice.

Fees Per Quarter

Summer,* Fall, Winter, and Spring Quarters

Resident Non-Resident

Tuition and Registration.....	\$117.50	\$287.50
Other Fees	\$ 26.50	\$ 26.50
Total Fees	\$144.00	\$314.00

*Non-Resident (non-Utah) students are allowed the Resident Schedule Summer Quarter.

Other Fees, Costs

Health and Accident Insurance: Students are required to participate each quarter in a health and accident insurance program unless a written request for exemption is submitted to the University prior to registration. Approximate cost of the insurance is \$6 per student per quarter.

Excess Registration Fee: For each excess hour (except two hours of Military Science, Aerospace Studies, or one hour of Physical Education)\$10
Students may register for 19 credit hours per quarter without paying excess registration fees.

Automobile Parking Permit: \$7.50 per year.

Out-of-State Student Auto Permit: 50¢
(In addition to Parking Permit of \$7.50)

Late Registration Fee: \$5 beginning second day after specified Registration Days plus \$1 per additional day up to a maximum of \$10.

Special Students—Registration fee\$10
Plus \$8 per credit hour (maximum of six credits)

Visitor Fee—Registration as a listener or visitor in lecture course only in which no credit is desired, per quarter, per class\$12

10 Financial Assistance

Graduate Record Examination: Aptitude Test, \$8; Advanced Test, \$9; Both at once, \$15. See page 13.

Graduation Fee\$10

Transcript of Credits: \$1 per copy, 25¢ for additional copies on the same order. Transcripts will not be issued unless the money accompanies the order.

Cap and Gown Rental:

Master's\$6.50
Doctor's\$7.50

Refunds: All fees paid, with the exception of the \$10 registration fee may be refunded to any student in residence who withdraws from school before the end of the seventh week, in proportion that the number of instructional weeks subsequent to withdrawal bears to the number of instructional weeks

in the period covered by the fees paid.

Studentbody Card: According to the constitution of the Associated Students, a regularly enrolled student must obtain, at time of registration, a studentbody card which will admit him to all activities controlled by the Associated Students; athletic events — football, basketball, tennis and track — dramatics and musical entertainments, socials, lectures, etc.; will give him a copy of the yearbook if the studentbody fee was paid for all quarters, and a subscription to the University newspaper. The system has been found to be a great saving to the students and an excellent means of fostering proper interest in student activities.

University Publications: General Catalog, \$1; Class Schedule Bulletin, 25¢. A more detailed fee schedule is in the General Catalog.

Financial Assistance

General. Assistantships, both for teaching and research are generally available in most of the departments of the University. USU conforms to the agreement made by most of the Graduate Schools of the United States to announce fellowship and scholarship appointments on April 1 and permit the student a two-week period in which to accept or reject.

Many students not receiving assistantships or fellowships receive financial assistance by working for departments on an hourly basis.

Assistantships

Teaching Assistantships. Students receiving these appointments assist with teaching in the departments. The contracts generally cover the period October 1 to May 31, or September 15 to May 31. The stipend varies from \$1100 to \$3600. The corresponding service load varies from one-fourth to one-half time. Maximum credit load for students on half-time teaching assistantships is 12 credit hours.

Research Assistantships. These are subject to the same basic pattern for duration, service load, and stipend, but may be varied to meet the need of the particular research program on which the student works. Maximum credit load for students on research assistantships is 12 credit hours, except that students conducting research resulting in a thesis or dissertation may register for an additional four units of research and thesis credit.

Fellowships and Traineeships

University Research Fellowships. These fellowships carry a stipend of \$3500 for the academic year and remission of nonresident tuition. The student is required to carry a full load of at least 12 credit hours and to participate successfully in a research degree program including a Master's thesis or Doctor's dissertation. These are one-year appointments tenable in any field in which USU grants an advanced research degree. Application must be made by February 15 for the coming school year.

Traineeships. The University has traineeship programs supported by National Institutes of Health, National Science Foundation, and the National Aeronautics and Space Administration. The basic stipend is \$600 per quarter, with tuition and fees paid by the grant, and with additional allowances for dependents and progression. Most of the major departments participate in these programs.

NDEA Fellowships. These fellowships are available at USU in Bacteriology, Botany, Chemistry, Civil Engineering, Ecology (interdepartmental program), Education, Electrical Engineering, Industrial and Technical Education, Mechanical Engineering, Physics, Plant Science, Range Science, Soils and Meteorology, Wildlife Resources, and Zoology. They are for students who wish to become college and university teachers, and who will undertake a doctoral program. Basic stipend is \$600 per quarter with additional for dependents and progression and with tuition and fees paid by the grant.

NSF Summer Traineeships for Graduate Teaching Assistants. These traineeships, provided by the National Science Foundation, are available to graduate teaching assistants at USU who can qualify. The stipend is as much as \$85 per week and fees paid by the grant.

Other Fellowships. The University also participates in the Graduate Fellowship Program of the National Science Foundation, in the Fellowship Program of the National Institutes of Health, the Martin Luther King fellowship and additional fellowships provided by private foundations and grants. Students should apply directly to these foundations. Addresses and information may be obtained at the School of Graduate Studies.

Waiver of Nonresident Tuition Fee. The nonresident tuition fee may be waived by the president of the University for students holding graduate appointments, that is, graduate fellowship appointments awarded through the School of Graduate Studies or won by students in national competition, contractual arrangements with the University for standard teaching or research assistantships, and government or other types of contracts with the University. Students being paid only on University payroll do not ordinarily qualify for nonresident tuition waivers. Employers of graduate students on payroll may request waivers for single quarters if the level of pay is comparable with that of standard assistantships and stability through the quarter is guaranteed. A student who holds a nonresident tuition waiver must maintain a "B" average if the waiver is continued from one quarter to the next.

The student's major professor or department head should recommend the waiver to the Dean of Graduate Studies, who may forward it to the president. Requests for waiver must be cleared with the Graduate Office at least two weeks before the beginning of the quarter in which the waiver is to become effective.

Nonresident Tuition Scholarships. The nonresident tuition scholarship may be awarded to students of high scholarship (defined as a g.p.a. of at least 3.7 for the two most recent school years, or 90 credit hours). Tuition scholarships are similarly initiated by a department head with a signed statement giving evidence of high scholarship, approved by the Dean of Graduate Studies, and recommended to the president.

Tuition Scholarships for Residents. Tuition scholarships are

available to graduate students who are residents of Utah and have a record of superior scholarship (g.p.a. of 3.7 or above for the most

recent two school years, of 90 credits). Applications should be made to the Student Services Office, Main 102.

Housing

Prospective students are invited to direct their applications and inquiries regarding housing to William Skidmore, Coordinator of Student Housing, USU, Logan, Utah.

University-owned housing includes apartment-living residence halls and room-and-board residence halls for single women, apartment-living residence halls and room-and-board residence halls for men, and University apartments for married students. A University Trailer Court provides accommodations for married students' private trailers. A \$25 application fee is required when applying for Uni-

versity-owned housing. Priority lists are based on date of application.

Seven residence halls built by the Church of Jesus Christ of Latter-day Saints provide facilities for 504 USU students. These halls are group-living units where six students live together in a fully equipped apartment. For information and application forms, write to: Manager, LDS Student Living Center, USU, Box 220, Logan, Utah 84321.

Students desiring off-campus housing may procure the current housing list upon arrival at the University, Main 103.

Admission

Application and Admission

Admission to the School of Graduate Studies is obtained only through filing of an application and formal acceptance by the School of Graduate Studies. Application forms can be found on the inside back cover of this bulletin. The two copies of the Application for Admission and the Application for Admission Part II (pink sheet) must be filled out and returned to the Graduate Office, preferably at least 60 days in advance of the day of registration. Applications will *not* be considered

for the current quarter when submitted the week of registration.

Two official transcripts from each school previously attended must be submitted to the Graduate Office. The Bachelor's degree must be verified on the transcript. Foreign transcripts must be accompanied by an English translation. The student must request those listed as references on his application to send their letters of reference directly to the Graduate Office. Scores from the Graduate Record Exam must also be received from Educational Testing Service

before the application can be considered complete.

As soon as all items listed above are received, the student's file is forwarded to the department concerned for its recommendation. If accepted, both the student and the department are sent copies of the Permit to Register.

A graduate with a Bachelor's degree from any accredited college or university may be admitted to the School of Graduate Studies if: 1) he is recommended by a department for an advanced degree program and 2) he meets the scholastic requirements of the School of Graduate Studies. A "B" average in the most recent two years of academic work is necessary for admission to the School of Graduate Studies.

Transition from Bachelor's Program. A Senior at USU who lacks not more than six credit hours for the completion of his Bachelor's degree at the beginning of any quarter may enter the School of Graduate Studies provided the six credit hours are completed that quarter. Two copies of a form showing the division of courses between the undergraduate and graduate program, signed by the student's major professor, his undergraduate dean, and the Dean of Admissions and Records, must accompany the student's application for admission. This transitional program is permitted only for students who have an average of "B" or better in their courses in the Junior and Senior years.

Matriculated Graduate Students

Those admitted without restriction to a graduate program are classified as matriculated graduate students.

GRE. The aptitude section of the Graduate Record Examination is required by the School of Graduate Studies for admission to a graduate degree program. The only exceptions to this rule are MBA and Accounting candidates, who are required to take the Admission Test for Graduate Study in Business (ATGSB). For information and application forms contact:

GRE

Educational Testing Service
Box 955, Princeton, New Jersey
08540

or

1947 Center Street
Berkeley, California 94704

ATGSB

(Admission Test for Graduate
Study in Business Education
Testing Service)
Box 966, Princeton, New Jersey
08540

In addition to the aptitude test, candidates in Electrical Engineering must take the Advanced Test in either Math, Physics, or Engineering. Candidates in Political Science must take the advanced test in Political Science. Students entering the Doctor of Education program must take the Advanced Test in Education in addition to the Aptitude Test.

Nonmatriculated Graduate Students

A student holding a baccalaureate degree awarded by an accredited institution may be classified as a nonmatriculated student and be granted permission to register for either undergraduate or graduate courses. Most commonly, the reasons for this classification are:

- 1) The student is not working on a graduate degree program but is taking courses to meet teacher certification requirements or for other reasons.

14 Admission

2) A complete application for admission to the graduate school has not been submitted or was submitted too late for adequate consideration.

3) Departmental recommendation which may stipulate certain prerequisite courses or additional data before reconsideration of the application for classification as a graduate student in a degree program.

4) Disapproval of a departmental recommendation by the Dean of the Graduate School because of low g.p.a. or other deficiency. (A g.p.a. of 3.0 for the most recent two years of academic work is the usual minimal standard for admission to a degree program.)

5) Negative recommendation from the department. (In such cases the applicant may choose to take courses as a nonmatriculated student with no real or implied status in a graduate degree program.)

6) Graduate Record Examination not taken or scores not acceptable.

Students might become fully admitted in the Graduate School at a later date by meeting the requirements stipulated by the academic department and/or the Graduate School. The requirements vary with the individual case, but in many instances they might be met by:

1) Consideration of the credentials by the department and a positive recommendation given (for the late applicant).

2) Completion of at least one quarter (12 credit hours minimum) of graduate or equivalent work with a 3.0 or higher g.p.a. in a course of study acceptable to the department. This basis for reconsideration is reserved for those students who have received a posi-

tive recommendation from the department.

3) The course work or credit hour load stipulations made by the department have been met satisfactorily.

Students registering in the non-matriculated category who desire to enter a degree program should seek informal counseling with departmental representatives for guidance in selecting courses which may be significant in meeting the requirements for obtaining graduate status or a graduate degree. A maximum of 18 credit hours earned as a nonmatriculated student may be approved by a department or a supervisory committee toward a graduate degree.

Students must secure and complete a Request to Matriculate form from the Graduate Office. This form must be returned to the Office of Admissions and Records before credit hours (a maximum of 18) taken as a nonmatriculated student will be recorded on a degree program.

As long as the student is not matriculated, the adviser will be appointed by the dean of his academic college or the head of his department. The School of Graduate Studies will provide assistance and advice.

Registration

A registration packet is made up for a graduate student upon receipt of the Application for Admission Part II.

This pink application form must be resubmitted if a student drops out of school for a quarter or more. Summer Quarter students must submit this form each summer they wish to attend.

Adviser and Supervisory Committee

When a student enters the School of Graduate Studies he should seek the assistance of the head of the department of his interest in obtaining an adviser who can assist him with selection of course work until a supervisory committee is appointed. If the student's grades are satisfactory for a quarter, and he otherwise shows promise of succeeding at his program, the head of the department, after consultation with the student, will recommend to the Dean of Graduate Studies the names of faculty members to be appointed to the supervisory committee for the student. The committee will include not less than three members for Master's candidates and five members for Doctoral candidates. One member of each committee should be from an area out of the student's major area. The designated chairman of the committee then becomes the student's adviser. A supervisory committee will not be appointed until all entrance procedures have been satisfactorily completed and the student has designated his major area.

If a committee member should be unable to serve on an oral examination, a new (or substitute) member is recommended by the head of the department and approved by the Dean of the School of Graduate Studies. A committee may be revised by the same procedure outlined above for the formation of a new committee.

Grades

Graduate students are expected to do superior work, and in general, to maintain an average of "B" or better. The student's supervisory committee may accept the grade of "C" if it sees fit. Grades below "C" constitute failure in the course.

Staff members are authorized to use the grade "P" (passed) for seminar, special problems, and thesis courses.

All incomplete (I) grades for course work must be removed from the student's record before the final examination can be set. It is the student's responsibility to see that "I" grades for thesis are removed before the May 15 deadline for students receiving degrees in the June commencement.

Credit Load

Recommended maximum load for full-time graduate students is 16 credit hours. Maximum for assistants engaged in teaching or research is 12 credit hours, except that students assisting in research which results in their thesis or dissertation may register for the full load, if such registration includes at least four credit hours of research or thesis.

Continuing Graduate Student Advisement

Any graduate student at the University using the Library, laboratory, or other University facilities and/or under faculty supervision for the completion of a degree program must register each quarter for a minimum of three credit hours.

If the student does not enroll in regular courses, seminars, independent study or thesis for the minimum of three credit hours, he must register for "Continuing Graduate Advisement" (department designation course number 400) to make a minimum enrollment of three credit hours. Students who have received maximum thesis credit, but who have not completed the thesis or dissertation, must enroll for a minimum of three credit hours. A student must

be registered during the quarter in which he completes his degree requirements. If the student does not comply, his candidacy will be suspended and his supervisory committee terminated.

Time Limit

Work for a graduate degree must be completed within six years from the date of matriculation as a regular student in the School of Graduate Studies. Older work may be revalidated by examination. Statements signed by the student's committee and department head specifying action taken on particular outdated courses and giving procedures by which they have been revalidated must be submitted to the Graduate Office for approval before such courses can be used to fulfill the requirements for a degree.

Residence Requirements

The resident requirement for the Master's degree permits a maximum of 18 credit hours of off-campus credit to be used in the program, exclusive of thesis, off-campus meaning courses taken in resident instruction centers of the University. A minimum of 15 credit hours must be taken on the Logan campus. In Education a minimum of 27 credit hours inclusive of thesis must be taken on the Logan campus.

In the Doctor of Education program, a minimum of four quarters of residence on the Logan campus is required, three of which must be in consecutive sequence. In the Doctor of Philosophy program a minimum of one year of full-time (at least 12 credit hours per quarter) residence beyond the Master's degree is required.

Extension Course Credit

The amount of extension classes or other off-campus credit to be

allowed will be determined in consideration of the entire course program. As stated above, the total of all off-campus credit may not exceed 18 credit hours exclusive of thesis. All extension courses for which graduate credit is sought must be regularly registered for through the School of Graduate Studies, and must have the sanction of the head of the department in which graduate work is being done. Credit toward a graduate degree is not granted for Independent Study (correspondence) courses.

Transfer Credit

Up to nine credit hours of graduate work may be transferred from another approved graduate school as part of a Master's program. An exception is made for the inter-university curriculum in Engineering Science.

In the doctorate program, the supervisory committee may determine the number of credits that may be transferred from accredited universities for a particular program. The time limit of six years applies to transfer credit as well as that taken at USU. The supervisory committee may require that part of the program be taken at another university, in which case the credit for this part will be transferred from the other institution to Utah State before the completion of the degree program.

Thesis Credit in Absentia

Where the student's program calls for work on the thesis away from the campus, the student must register each quarter, as required by the program, for thesis in absentia. The cost for this is the registration fee and the tuition fee only, all other fees not assessed.

Degree Requirements

Master of Science and Master of Arts

Major and Minor

The Master's degree is awarded for work done in a major field with a supporting minor in one or more related subjects approved by the committee. The supervisory committee, which is recommended by the head of the major department in consultation with the student and appointed by the Dean of the School of Graduate Studies, will represent both the major and minor fields. In exceptional instances, the major and minor may be in the same department though involving different subjects.

Application for Candidacy

As soon as the supervisory committee and student have agreed upon the course program to be followed by the student, and upon a thesis topic, three copies of the application for candidacy form should be completed by the student. He will obtain the signatures of his department head and supervisory committee members and file the application for candidacy in the Graduate Office, together with a thesis statement.

The application for candidacy should be completed by the Master's degree candidate as early in the graduate program as possible and must be filed before the end of the second quarter of graduate work.

Course Requirements

The minimum requirement for the Master's degree is 45 hours of approved graduate credit.

See also pages 15, 16 for additional information concerning cred-

it which can be applied toward graduate degrees. Other requirements may be indicated by the specific department.

Language Requirement

Candidates for the Master of Arts degree only must have two years of foreign language or equivalent competency.

Thesis Requirement

A thesis statement should be submitted to the Graduate Office at the same time application for candidacy is made. This statement should briefly indicate the origin and nature of the problem, objectives of the investigation, and methods of procedure.

A candidate for a Master's degree usually must present a thesis on a topic within the field of his major subject, which represents from nine to 15 hours of credit. The thesis must be a contribution to the field of knowledge, based upon the student's own research, or a treatment and presentation of known subject matter from a new point of view.

A handbook designed to help the graduate student prepare his thesis, dissertation, seminar paper, or Plan B report has been published by the USU School of Graduate Studies and may be purchased at the Bookstore. A "Thesis Procedure Check List" is presented inside the back cover of this *Handbook for Preparing Dissertations, Reports and Theses*.

The major professor or thesis director will supervise the preparation of the thesis. When it is written in good form, grammatically and structurally correct, the major professor will sign, thus certifying that it is properly organ-

ized and written in good English. After the major professor has approved the thesis, copies will be submitted to other members of the committee at least two weeks before the final oral examination. The student is responsible for revisions following the final committee meeting and obtaining all signatures on the title page. Four copies of the signed and fully approved thesis must be deposited in the Graduate Office. After binding is completed, two of these copies will be deposited in the Library, another sent to the department, and the fourth returned to the student.

Thesis Abstract. In addition to the abstract which is included with each of the four official copies of the thesis, another copy of the abstract is submitted to the School of Graduate Studies for publication.

Thesis Alternate. The supervisory committee may permit the substitution of one or two advanced reports, valued at three to ten credits, for the regular Master's thesis. These are generally known as "Plan B" reports (or as seminar reports in the MED program and Master's papers for the MIE degree). The Master's program is otherwise the same under "Plan B." In certain specialized programs, no thesis or "Plan B" papers are required.

Plan B reports should follow the same general form as set forth for theses in the thesis handbook published by the USU School of Graduate Studies and available in the Bookstore.

Four copies of the Plan B reports (seminar reports or Master's papers) are required as with the theses. However, all Plan B reports, recitals, problems, and projects will be bound in a blue color to distinguish them from the theses and dissertations reporting research, which are bound in black.

Final Examination

The final examination for candidates receiving degrees at the June Commencement must be given by April 15. A form on which supervisory committee members may indicate that they approve the thesis (or reports) as presented, and are willing to participate in a final examination at the time proposed by the chairman, must be circulated by the student and returned to the Graduate Office at least three days before the examination. The Dean of Graduate Studies designates a chairman for the examination and approves the place where the final examination will be held.

Master of Education

The basic minimum requirements for this degree are the same as those for the Master of Science degree with these exceptions:

1) In lieu of a thesis, one seminar report upon a subject agreed upon by the faculty advisory committee. Four copies of each seminar report are deposited in the Graduate Office as with a thesis.

2) A minimum of 27 credit hours course work taken on the Logan campus. Nine credit hours in course work taken in designated residence centers may be counted as part of these 27 credit hours.

Master of Engineering Science

USU cooperates with the University of Utah and Brigham Young University in offering a program leading to the degree of Master of Engineering Science. The prescribed course of study for this degree is published in the General Catalog under "College of Engineering." These prescribed courses, except thesis, may be freely exchanged between the three cooperating universities, for this degree only, without restriction.

Master of Fine Arts

This is a specialized professional degree considered as the terminal degree for those engaged in the fine arts graduate program. A minimum of four quarters in residence, or approximately 60 credit hours is required of all candidates. However, a two-year period is generally required to complete the necessary work.

Inasmuch as the program for the MFA is highly individualized, the student should consult with the department concerning requirements.

Master of Business Administration

The MBA degree is of a general management nature designed to develop potential business and industrial leadership. This degree program is open to any student holding a baccalaureate degree in Business, Engineering, Liberal Arts, Education, Natural Resources, Agriculture, and the sciences, as well as other fields. The length of time required to complete the degree requirements varies from one to two academic years depending on the student's background. For details concerning the MBA Program, see page 41 of this catalog.

Master of Forestry

This degree program is available to students possessing a non-forestry Bachelor's degree with acceptable scholarship. For details concerning this program, see page 66 of this bulletin.

Master of Industrial Education

Requirements for the MIE degree can be found on page 73 of this bulletin.

Master of Landscape Architecture

The MLA degree is the professional terminal degree in Landscape Architecture and Environmental Planning. For details concerning the MLA program, see page 77 of this bulletin.

Master of Music

Requirements for the Master of Music degree can be found on page 81 of this bulletin.

Civil Engineer and Irrigation Engineer

The program for these degrees includes:

1) A minimum of six quarters of study, of which at least three quarters must be in residence at USU.

2) Completion of 90 credit hours of approved courses.

3) Completion of at least 30 credit hours in 200 series courses, exclusive of thesis.

4) Completion of an adequate thesis based on a research program for which a maximum 30 credits may be allowed.

Specialist Program in Education

Specialist in Educational Administration. Requirements are available from the Department of Educational Administration.

Doctor of Education

The College of Education offers a Doctor of Education degree in Curriculum Development and Supervision in which six departments participate. These departments all prepare teachers for public school, college and university teaching. They are: Elementary Education, Secondary Education, Special Education, Physical Education, Business Education, and Music.

Application for Candidacy. In the Doctor of Education program the application for candidacy form is not filed until the student has successfully passed the written comprehensive examination and the defense of dissertation problem.

A summary of the requirements for the Doctor of Education degree is as follows:

1) A Master's degree or equivalent.

2) A program of at least 90 credit hours of approved graduate study beyond the Master's degree. This includes specifically required and recommended courses and some professional and interdisciplinary elective courses. The program is approved by a supervisory committee usually comprised of five members. (See page 15.)

3) Possession of a valid teaching or administrator's certificate.

4) Two years of successful experience as a professional educator prior to admission.

5) Development of a high level of competency in a major area of specialization and a broad understanding of the over-all field of education.

6) A wide-range selection of interdisciplinary course work.

7) Satisfactory evidence of ability to write, such as a Master's thesis or other scholarly paper.

8) An acceptable dissertation for which a maximum of 18 credit hours may be given.

The information presented under the "Dissertation Requirement" for the Doctor of Philosophy degree would also apply to the Doctor of Education candidate.

9) Four quarters of residence at USU, three of which must be in consecutive sequence (minimum 12 credit hours per quarter).

Comprehensive Doctor of Education Examination. This written examination is given after the student has completed a minimum of 45 credit hours of work beyond the Master's degree. This examination will be prepared by the Department and administered by the School of Graduate Studies.

Defense of Dissertation Problem, Doctor of Education. In this interview the candidate will be called upon to present a review of the literature pertinent to his dissertation and a detailed outline of the dissertation plan. It is given after the student has successfully passed the written comprehensive education examination. The final examination in defense of the dissertation is conducted in the same manner as for other doctoral candidates.

Doctor of Philosophy Requirements

The PhD degree represents high scholarly achievement demonstrated by independent research and competence in a field approved by the supervisory committee.

At least three years of full-time graduate study above the Bachelor's degree or two years past the Master's degree is necessary. Requirements include approximately 135 approved graduate credit hours, or approximately 90 credit hours in addition to the Master's degree. About half of these 90 credit hours may ordinarily be devoted to research and thesis but the supervisory committee may approve a different proportion taking into account the student's background.

See also pages 15, 16 for information concerning grades, credit load, continuing graduate advisement, time limit, and thesis credit in absentia. The Doctor of Philosophy program requires at least one full year of residence at USU.

Supervisory Committee

The student's program of study is subject to approval by a supervisory committee, usually comprised of five members. The committee is recommended by the head of the department after consultation with the student and appointed by the Dean of the School of Graduate Studies. This committee, representing the major and minor fields, is responsible for the qualifying examinations, approval of the course of study, approval of the dissertation, and the final oral examination.

Application for Candidacy

A doctoral student should meet with his committee as early as possible to determine requirements for his individual program and should file an Application for Candidacy when the committee has delineated these requirements. A committee for a doctoral candidate may wish to consider the Statement of Thesis Problem at a later meeting, and this statement may be filed after the candidacy application.

Language Requirement

A reading knowledge of at least one modern language other than English is required in the PhD program. The language requirements may be met by a departmental alternative approved by the Graduate Council. Normally one of the languages of global scientific or scholarly communication — French, German, Russian, Spanish — will be selected according to the candidate's particular need. The requirement of a second modern foreign language is optional with the department in which the major is to be taken.

Testing and certification of language proficiency will be performed by the faculty of the Department of Languages on the basis

of courses completed and/or performance in language proficiency exams offered to eligible applicants semiannually (in November and in April). The required language proficiency should be demonstrated before the beginning of the third year of graduate work.

Dissertation Requirement

When the plan for the dissertation research is determined by the candidate and approved by his supervisory committee, a dissertation statement is filed in the Graduate Office. The dissertation should represent a contribution to the field of knowledge based upon the student's research.

The doctoral candidate is referred to the *Handbook for Preparing Dissertations, Reports and Theses*, available in the University Bookstore, for information concerning presentation of the dissertation to meet standards required by USU. Attention is particularly drawn to the "Thesis Procedure Check List" inside the back cover of the Handbook.

As with the Master's thesis, the dissertation must be written in good form, properly organized, and be grammatically and structurally correct before it is approved by the major professor and presented to the other members of the supervisory committee for consideration. The committee should receive the dissertation at least two weeks before the final oral examination. The student is responsible for revisions following the final committee meeting and obtaining all signatures on the title page. Four copies of the signed and fully approved thesis must be deposited in the Graduate Office. After binding is completed, two of these copies will be deposited in the Library, another sent to the department, and the fourth returned to the student.

A dissertation which is to be presented in partial fulfillment of an advanced degree may not be published prior to acceptance for the School of Graduate Studies.

Examinations

Comprehensive Doctorate Examination. This examination should be taken in the student's sixth or seventh quarter of graduate work. It must be successfully completed at least five months before graduation. The examination is prepared by the supervisory committee and administered under the supervision of the Dean of Graduate Studies. All parts of the examination must be taken within a period of 14 consecutive school days. The examination is graded and evaluated by the

supervisory committee and a written report of the results becomes a part of the student's record.

Final Doctorate Examination. This examination in defense of the dissertation must be completed by April 15. A form on which supervisory committee members may indicate that they approve the dissertation as presented, and are willing to participate in the final examination at the date proposed by the chairman, must be circulated by the student at least three days before the examination and returned to the Graduate Office with all signatures. The Dean of Graduate Studies will designate a chairman and the place of the examination.

Student Responsibility

Graduate students are expected to know the requirements and standards of their program and their department and to assume full responsibility for meeting them. It is the student's responsibility to inform himself and see that all necessary forms are prop-

erly executed and filed on time in the Graduate Office. In no case will a rule be waived or an exception made simply because a student pleads ignorance of it or asserts that he was not informed of it by his adviser or the Graduate Office.

Summary of Deadlines

All Graduate Students

Important deadlines for all graduate students are the following:

End of First Quarter of Study. Completion of all admission procedures. Delay beyond this time will seriously hinder the student's program.

Time Limit. The credit hours presented must not be older than six years. Older work may be re-validated by examination.

End of Winter Quarter. Applications for candidacy, including thesis statement, must be filed and approved by this time for students who will graduate at the next commencement.

Two Weeks before Final Examination. A typewritten copy of the thesis must be submitted to each member of the advisory and examining committee at least two weeks before the date of the final examination.

April 15. Application for graduation must be on file in Graduate Office for all who will graduate at the following commencement. This application bears the student's name as it will appear on the diploma. It is the basis for ordering the diploma.

April 15. Final examination must be completed for all who will graduate at the following commencement.

April 28. A signed thesis must be completed and in the Graduate Office. Refer to the Thesis Procedure Checklist inside back cover of *Handbook for Preparing Dissertations, Reports and Theses*. The Graduate Office thesis editor will check the thesis or report to be

sure that it meets USU requirements and standards of quality before it is accepted.

May 25. Four printed copies of the approved thesis or dissertation ready for binding must be delivered to School of Graduate Studies.

Doctoral Candidates

Doctoral candidates have the following additional deadlines:

Spring Quarter before Last Year of Doctoral Program. Language requirements should be completed.

Fall Quarter Preceding Graduation in Doctoral Program. Comprehensive doctorate examination must be successfully completed at least five months before graduation.

Commencement

Advanced degrees are awarded at the annual commencement exercises, generally the first week of June. Graduates are urged to attend if possible. About May 1 all students who have completed their programs and others likely to do so will receive an announcement of the commencement dates, together

with reservation blanks for printed announcements and academic dress.

Students who wish to participate in the baccalaureate services and commencement exercises must be at the designated meeting place in academic costume one-half hour before the procession is scheduled to begin.

Courses in the Graduate Program

Courses in the graduate program at USU are printed here under the appropriate department. A course listed in the 100 series may become part of a student's degree program provided: 1) the course has not been taken in the undergraduate curriculum, 2) the course does not exceed the number of hours credit allowed in the 100 series, and 3)

the course is approved by the student's supervisory committee.

Courses taught specifically for graduate students are numbered in the 200 series. In the College of Education and some other fields, courses generally reserved for doctorate students are numbered in the 300 series.

Interdepartmental Curriculums

Interdepartmental Curriculum in

Curriculum Development and Supervision

Chairman: Gail Johnson, EdD, University of Oregon

Office: Education 206 C

Degrees offered: EdD with special emphasis in Business Education, Elementary Education, Music Education, Physical Education, Secondary Education, and Special Education

The College of Education offers an interdepartmental program leading to the EdD in Curriculum Development and Supervision. This degree is offered to those preparing to become curriculum specialists, coordinators, or supervisors in public school systems and to those preparing to teach at the college or university level in teacher preparation in one of the six participating departments listed. These

departments are: Elementary Education, Secondary Education, Special Education, Physical Education, Business Education, and Music.

For information concerning this degree, write to the head of the department or the chairman of the Doctor of Education Committee in Curriculum Development and Supervision in the College of Education.

Interdepartmental Curriculum in

Ecology

Director: John M. Neuhold, PhD, Utah State University

Office: Forestry-Zoology 217

Degrees offered: MS, PhD

The USU Ecology Center was created in 1966 by the President and Board of Trustees of the University. Its creation was formal recognition of the importance of Ecology in the overall program of the University. The objective of the center is to provide coordination and leadership in teaching and research programs in Ecology at USU.

At USU Plant Ecology teaching and research developed in the Departments of Range Science, Forest Science, and Botany. Animal

and Aquatic Ecology developed in the Departments of Wildlife Resources and Zoology. Courses in environmental influences developed in the Department of Geology and in the Department of Soils and Meteorology.

The creation of the Ecology Center allowed the development of an interdepartmental curriculum in Ecology, pooling the resources of the seven departments listed above plus the Bacteriology Department and the recently formed Plant Science Department. It is now pos-

sible for students to earn MS and PhD degrees in Ecology while maintaining residence in any of the nine departments. The residence department corresponds with the candidate's area of interest and the assignment of his major professor.

Competence in Ecology requires a background in a large number of disciplines. Although ecologists have usually had their primary training in Biology, they must also have some understanding of Geology, Soils, Meteorology, Chemistry, Physics, Mathematics, and Statistics. To provide this background, the following courses should be completed in the undergraduate program or early in graduate study: College Algebra, Trigonometry, and Differential and Integral Calculus, at least two quarters of Applied Statistics, General and Organic Chemistry, Physics (one year), General Biology (one year) or General Botany and General Zoology, Plant Taxonomy, Genetics, Introductory Ecology or separate introductory courses in Plant and Animal Ecology.

A list of courses contributing to degree programs follows. The actual course of study is tailored to each student's interests and needs through his selection as guided by his major professor and graduate committee. The curriculum committee of the Ecology Center reviews all candidates' programs to assure that the following minimal requirements are met:

Applicants for an MS degree in Ecology are required to take a minimum of five courses from those listed below, including at least one from Group A and one from group B or C. One hour of seminar is required. Those interested in Plant Ecology, in addition, are required to show credit for Soil

Survey and Classification (Soils 114 or equivalent) and Plant Physiology (Botany 120 or equivalent). Students emphasizing Animal Ecology are required to take an upper division Animal Physiology course.

Applicants for the PhD degree in Ecology must take a minimum of 25 credit hours from the list below, including at least one course (excepting seminar) each from Group A and two courses each from Groups B and C. A PhD candidate must obtain three credit hours for the interdepartmental Ecology seminar.

A research thesis is required for all degrees. The Ecology Center Director or his representative must be a member of the student's committee.

For titles of specific courses, refer to the departmental headings. Course descriptions are found in the University General Catalog.

Group A. Integrated Ecology

Biology 100
Botany 200
Range Science 231
Ecology 201 (Seminar)

Group B. Plant Ecology

Range Science 210, 211, 215, 221
Forest Science 204

Group C. Animal Ecology

Wildlife Resources 148, 260, 262
Entomology 206
Zoology 233
Physiology 253

Group D. Supporting Courses

Botany 121, 224, 228, 212, 225, 227
Chemistry 180 or 190
Forest Science 220, 221
Geology 115, 134, 212
Meteorology 125, 117, 120, 126, 129, 130, 133, 145, 225
Soils 155, 165
Wildlife Resources 161, 166, 248
Zoology 113, 132
Physiology 151, 141
Plant Science 223
Bacteriology 192, 110, 210

plete 25 percent of the total number of credits required for graduation each academic year (September through August). Students in five-year courses should complete 20 percent of the total each year. *Note:* Students who take more than six credits will be charged full fees for the quarter. (See pages 8 and 9 on Special Fees.)

Incomplete Work. Students are required to complete by the end of the quarter all courses for which they have registered. This includes correspondence courses (Independent Study) for which a student may be concurrently registered. Incomplete grades can be granted by an instructor only when permission is granted by the dean of the college in which the course is offered before the close of the quarter. The necessary petition form may be obtained at the Office of Admissions and Records or the dean's office. All "Incompletes" for undergraduate students must be made up within a period of 15 months. If this is not done, the "Incompletes" will be frozen on the permanent academic records.

Low Scholarship and Probation. *A student shall be placed on warned status* at the end of the quarter in which his cumulative grade point average is 4 points less than would be required for a 2.0 grade point average. He shall remain on warned status until his cumulative grade point average is raised to or exceeds 2.0.

A student shall be placed on probation at the end of the quarter in which his cumulative grade point average is 12 or more points less than would be required for a 2.0 grade point average. A student shall remain on probation until his cumulative grade point average is raised to or exceeds 2.0. Following the quarter for which a stu-

dent is placed on probation, *he shall be notified of his status by a letter from his academic dean in which he shall be instructed to visit his adviser before the end of the fifth week to sign a statement by which he acknowledges the terms of the probation. The signed statements shall be collected in the academic dean's office.*

A student on probation shall be suspended at the end of the quarter in which his grade point average for the quarter is less than 2.0.

A suspended student may be considered for retention by the Appeals Committee at the recommendation of the student's academic dean.

After a student who has been dropped for low scholarship has been out of the institution for one quarter or more, he may apply for readmission. Such application is made to the Admissions Committee. If permitted to register, he may enroll in the General Registration unit on probationary status.

A student on probation in General Registration who does not maintain a "C" average" may be denied permission by the Admissions Committee to re-register in that unit. In such cases the Chairman of the Admissions Committee will recommend to the President that the student seems unable to profit from the University experience and should be dropped from the University.

If a student is admitted on "warned" status and fails to maintain a satisfactory grade point average for two quarters, he may be suspended at the end of the second quarter. Students who are admitted on probation may have only one quarter in which to remove probational status.

Interdepartmental Curriculum in

Nutrition

Chairman: Ethelwyn B. Wilcox, PhD, Iowa State University

Office: Family Life 111

Degrees offered: MS, PhD

Facilities of the several departments conducting human, animal, plant, or metabolic nutrition and biochemical research have been made available in this curriculum to afford students maximum opportunity to gain experience and training in the biochemistry of nutrition.

Major problems currently being studied are effects of toxic and non-toxic substances on digestion and metabolism, atmospheric pollution, lipid metabolism, amino acid metabolism, and other basic physiological processes related to nutrition.

Training in the curriculum is designed as preparation for research in educational institutions, governmental and industrial laboratories, and for college teaching.

Prerequisites for a major in the curriculum include basic training in English, Chemistry, Mathematics, Physics, Bacteriology, Botany,

Physiology, and Zoology. For specific requirements for the MS or PhD degrees, write the curriculum chairman. Any deficient prerequisite work must be completed without graduate credit.

Master's Degree Requirements

Courses	Credits
Advanced Nutrition	10
Advanced Biochemistry	10
Statistics	8
Electives and Research	17-21
Total	45-49

Doctorate Degree Requirements

Advanced Nutrition	18
Advanced Biochemistry	20
Statistics	12
Physical Chemistry	One Year
Research	45
Electives	31
Total	137

For more specific details concerning admission, requirements, and available scholarships and fellowships write to the curriculum chairman.

Interdepartmental Curriculum in

Toxicology

Chairman: James L. Shupe, DVM, Cornell University, Pathology and Toxicology Residency, Walter Reed Medical Center Institute of Pathology, Washington, D.C.

Office: Veterinary Science 103

Degree offered: PhD

The interdepartmental curriculum in Toxicology trains and educates individuals on the graduate

level in various disciplines of Environmental Toxicology. These individuals have been and will be

prepared as research scientists to supervise toxicology activities in educational, governmental, and industrial institutions.

In the past, fluorides, insecticides, herbicides, and other pesticides; plant, animal and bacterial toxins; air, soil, and water pollutants; food chemicals and contaminants; carcinogens, and minerals have been studied in livestock, fish, game-birds, wildlife, and laboratory animals. Many new toxicologic problems are arising. They demand attention because of the multiple use and contamination of our environment due to the rapid increase in population, increase in industrial production, and increase in the use of transportation vehicles. To assist in solving these problems, the principle direction of training includes mode and mechanism of toxicosis, toxicant metabolism, pathologic effects, physiologic responses, characterization and analysis of toxicants; pollution of air, water, and soil; environmental effects and relationships. Well-equipped laboratories and facilities for handling and housing animals are available.

Students with appropriate training in biological or physical sciences, such as Chemistry, Zoology, Entomology, Physiology, Ecology, Wildlife, Nutrition, Animal Science and Technology, Pharmacy, Medicine, or Veterinary Medicine may enter the Toxicology curriculum at the pre-doctoral or post-doctoral levels. Since the previous training and area of interest of each trainee are varied, the specific course work of each student will be determined by the graduate committee. This will involve a basic core of courses plus courses in an area of emphasis as outlined below:

Core Program	
Courses	Credits
Introduction to Environmental Toxicology	3
Pharmacology	5
Toxicology	10

Pathology and/or Physiology	10
Biochemistry (basic year sequence)	11
Statistics (including Bioassay Statistics)	11
Toxicology Seminar	3
Total	53

Additional courses totaling 20-25 credit hours would be selected by the student to provide balanced training in some area of emphasis within the general field of environmental toxicology. The major options anticipated include:

1) **Chemical emphasis.** Individuals would be primarily concerned with toxicant chemistry, the metabolic or physical degradation of toxicants, and analysis of toxicants and their degradation products. Additional courses would generally be selected from: Physical Chemistry, Advanced Organic Chemistry, Organic Analysis, Advanced Biochemistry.

2) **Pathology-Pharmacology emphasis.** Individuals would be primarily concerned with general effects of toxicants on the structural and functional aspects of an organism or animal. Additional courses would generally be selected from: Histology, Cytology, Cellular Physiology, Special Pathology, Advanced Physiology, Advanced Biochemistry, Mycology, Immunology, and Toxicologic Animal Pathology.

3) **Environmental emphasis.** Individuals would be primarily concerned with effects of toxicants on organisms within ecosystems. Additional courses would generally be selected from: Animal Ecology, Limnology, Comparative Physiology, Stochastic Methods, Environmental Sanitation, Pollution Biology, Water and Sewage Treatment, Air Pollution Climatology.

Other electives in Toxicology would be Insecticide Toxicology, Agricultural Sprays and Dusts, Biochemical Basis of Herbicidal Action, Food Toxicology, and Toxicologic Animal Pathology.

Interdepartmental Curriculum in

Water Quality

Chairman: Norman B. Jones, MS, University of California

Office: Engineering L-229

Degree offered: MS

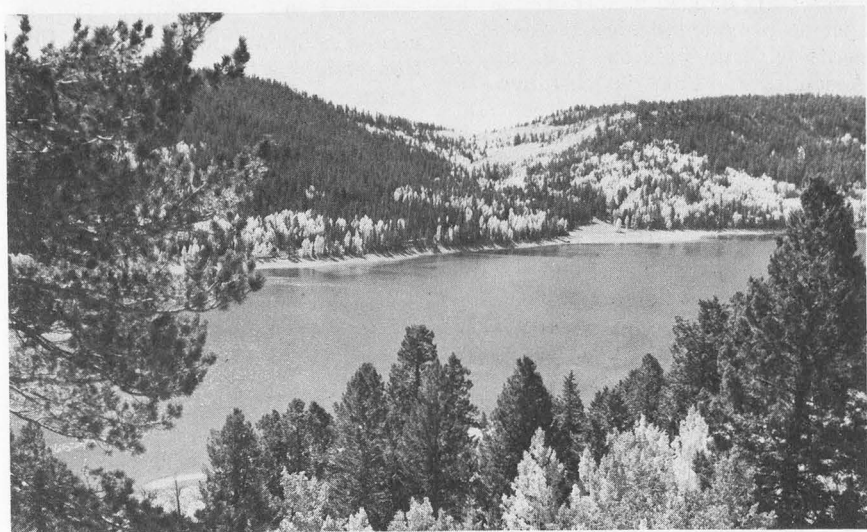
The interdepartmental program in Water Quality combines the resources of the Departments of Agricultural and Irrigation Engineering, Bacteriology and Public Health, Chemistry, Civil Engineering, Soils and Meteorology, and Wildlife Resources. Additional support, particularly for the research program, is provided by the Utah Water Research Laboratory, the Center for Water Resources Research, and the Center for Pollution Research.

The curriculum is designed to involve graduate students from all pertinent disciplines associated with the major beneficial uses of water. The primary objective is to develop professional and competent people, at both the MS and PhD levels, who will be water quality specialists, possessing a breadth of understanding of the general

scientific and technological context in which they must work.

A strong interdisciplinary emphasis is maintained in each student's academic program and research topic through the requirement of a minimum core of course work outside of his major department and a multi-discipline graduate committee. Upon successful completion of the program, degrees will be awarded by the department in which the student is enrolled.

The program is currently supported, in part, by two United States Departments of Interior, Federal Water Pollution Control Administration Training Grants. Interested students may apply for fellowships covering tuition, fees and a stipend. Director of the FWPCA Training Grants is N. B. Jones.



Departments of Instruction

¹Department of

Accounting

Head: Norman S. Cannon, PhD, Columbia University; CPA, State of Utah

Office: Business 509

Degree offered: MS

The typical graduate program in accounting is designed for the student with an undergraduate degree in Accounting and should take three quarters to complete. The following requirements must be met: 1) the equivalent of our undergraduate degree in Accounting; 2) a total of 45 credit hours of graduate work approved by the head of the Accounting Department.

Plan B Option. A student may elect to write a Plan B project in connection with Accounting 297 for up to 12 hours of credit toward the degree requirement.

Special Program. There is a special program designed for students with no previous training in Accounting. This is designed to be completed in five quarters and is organized to start Summer Quarter for highest time efficiency. A student with a strong background in Accounting can complete this program in less than 15 months. An outline of the requirements for this program is listed below.

There is a substantial difference in professional exposure of these two groups of Master's candidates. The special group will be about three quarters worth of work behind the typical student. Justifi-

cation is found in the professional advantage that these people will have in possessing a degree in a field outside of the area of professional specialization.

There will be a number of prospective students who fall between these two categories in preparation. Students with some undergraduate exposure to Business and Economics may use these generally to reduce the total requirements of the special group down to the level of 60 credit hours. Reductions below this level can be made only if the level of exposure to more advanced professional courses is made in accordance with a sliding scale devised by the Accounting Department. Students in this classification should write for an individual appraisal and estimate of the program.

Admission. Applications for admission should be submitted to the School of Graduate Studies. Prior to admission the student should take the ATGSB and have the results sent to that office.

SUGGESTED CURRICULUM FOR STUDENTS WITHOUT PRIOR TRAINING IN ACCOUNTING

Summer Quarter	
Courses	Credits
Accounting 201, 202	6
Economics 51	5
Math 66	5

 16

¹In College of Business

Fall Quarter

Accounting 203	4
Economics 52	5
Business Administration 131	3
Business Administration 151	5
—	17

Winter Quarter

Accounting 204	4
Economics 107	4
Accounting 111	5
Business Administration 132	3
—	16

Spring Quarter

Accounting 205	4
Economics 108	4
Business Administration 133	4
Accounting 127	4
—	16

Summer Quarter

Business Administration 204,	
Commercial Laws	3
Accounting 140	4
Accounting 121	4
Business Administration 181	5
—	16

Accounting Courses

- 100. Survey of Accounting Principles. (4)
- 101, 102. Intermediate Accounting Principles. (4, 4)
- 103, 104. Advanced Accounting. (4,4)
- 111. Industrial Cost Accounting. (5)
- 112. Advanced Cost Accounting. (3)
- 119. Accounting System and Automation. (3)
- 121. Auditing Theory and Practice. (4)
- 127, 128. Income Tax Accounting. (4, 4)
- 129. Government Accounting. (3)
- 140. Accounting Theory. (4)
- 199. Internship in Accounting. (Arr)
- 201, 202. Accounting for Management Control. (3, 3)
- 203, 204. Intermediate Accounting Practice. (4, 4)
- 205. Advanced Accounting Practice. (4)
- 206. CPA Law Review. (3)
- 207, 208. CPA Review. (3, 3)
- 212. Cases in Cost Accounting. (3)
- 221. Seminar in Auditing. (3)
- 227. Tax Research and Planning. (3)
- 241. Seminar in Controllorship. (3)
- 290. Thesis. (Arr)
- 295. Independent Research and Reading. (Arr)
- 297. Accounting Seminar. (3)
- 400. Continuing Graduate Advisement. (3)

Department of

Agricultural Education

Head: Von H. Jarrett, PhD, University of Missouri
Office: Agricultural Science 110
Degree offered: MS

Opportunity is offered for research and graduate study in Agricultural Education. Students planning to do graduate work should select a coordinated program of study in the Colleges of Agriculture and Education.

¹In College of Agriculture

Agricultural Education Courses

- 225. Special Problems in Agricultural Education. (2-5)
- 280. Research and Thesis. (Arr)
- 281. Seminar.
- 290. Special Problems for Agricultural Teachers. (2-5)
- 291. Special Problems. (2-5)
- 400. Continuing Graduate Advisement. (3)

¹*Department of*

Agricultural and Irrigation Engineering

Head: A. Alvin Bishop, PhD, Colorado State University; registered professional engineer; international consultant

Office: Engineering C-215

Degrees offered: MS, PhD

Development of irrigation systems is one of man's oldest engineering endeavors, and it is even more important today than it was centuries ago. Since irrigation makes arid land productive and provides a great flexibility in cropping patterns it will be a major factor in solving the world food problem. On the other hand, irrigation is a major consumptive use of water and is probably a major factor in the quality change in the waters of all streams providing irrigation supplies. With the world food problems and water pollution in the spotlight — superimposed on a mounting demand for water by all users — irrigation, power, industry, municipal, culinary, navigation, recreation, fish and wildlife — the challenge facing the irrigation engineer has never been greater and his opportunities and future have never been brighter.

In more than 75 years of irrigation engineering experience, USU has attained a world-wide prestige through the successful professional records of its many graduates. In addition to an accredited BS program in Agricultural Engineering, a program leading to both the MS and PhD degrees is offered in this field. The MS and PhD degrees are also offered in Irrigation Science and in collaboration with related departments.

Close interdepartmental association with Civil Engineering, Plant Science, and Soils and Meteorology is achieved to strengthen the program of those wishing special emphasis in these aspects of the science.

A diagnostic examination covering the undergraduate engineering subject matter may be given to all entering graduate students. The exam includes mathematics, fluid mechanics, and soil-water-plant relationships for those seeking an MS degree in Agricultural or Irrigation Engineering. For those seeking an advanced degree in Irrigation Science, the exam includes mathematics and soil-water-plant relationships.

The department is housed in the new Engineering and Physical Sciences Building. In addition to the modern classrooms and laboratories in the Engineering Building, the department operates a research farm for studying irrigation and drainage problems. The department also cooperates on irrigation and drainage projects with the various Agricultural Experiment Station farms and commercial farms in the area, and works with the Utah Water Research Laboratory in conducting the graduate program of the department.

The department is heavily involved in overseas research and training activities concerned with on-farm water management and

¹In College of Engineering

water resource development. These programs and others make it possible to offer graduate students financial support in the form of assistantships and traineeships. The financial support is mainly available to U.S. citizens with a small number of assistantships for others. The traineeships and assistantships are attached to research projects on the Logan campus and overseas. Students who desire to be affiliated with the overseas program may be assigned to a project in Latin America to do their thesis or dissertation research, in which case overseas travel expenses will be paid. Traineeships carry full tuition and additional financial support. Traineeships are available for students interested in the pollution problems of irrigation return flow or on-farm water management in Latin America.

Research projects in several areas of irrigation and drainage engineering are currently being conducted by the department. Hence, graduate students have the opportunity to conduct research for their MS and PhD degree programs. Current projects include hydraulics of surface flow, consumptive use, return flow of irrigation waters to river systems, water quality, soil system responses to

various irrigation waters and application techniques, transient flow in tile drainage, etc.

Agricultural and Irrigation Engineering Courses

- 108. Engineering Aspects of Soil and Water Conservation. (4)
- 110. Irrigation Principles. (3)
- 143. Irrigation Principles. (3)
- 145. Surface and Subsurface Drainage. (4)
- 146. Water Conveyance and Control. (4)
- 147. Sprinkler Irrigation Design. (3)
- 148. Design of Farm Irrigation Systems. (3)
- 149. Water Law and Institutions. (3)
- 160. Water Management. (3)
- 230. Special Problems in Agricultural Engineering. (Arr)
- 231. Irrigation Science. (3)
- 232. Sprinkler Irrigation Engineering. (3)
- 233. Surface Irrigation Engineering. (3)
- 235. Irrigation Return Flow. (3)
- 245. Advanced Design of Drainage Systems. (3)
- 273. Special Problems in Agricultural Engineering. (Arr)
- 298. Graduate Thesis. (Arr)
- 299. Graduate Seminar. (1)
- 400. Continuing Graduate Advisement. (3)

¹*Department of***Animal Science****Head:** James A. Bennett, PhD, University of Minnesota**Office:** Animal Science 201**Degrees offered:** MS, PhD

Course work and research leading to the MS and the PhD degrees are offered. Specialized fields of study for the MS and PhD degrees include: Animal Breeding, Nutrition, and Physiology, and the MS in Management. Facilities are available to conduct research with farm animals, poultry, and laboratory animals. In cooperation with other departments, the MS and PhD degrees are offered in Nutrition and Biochemistry. (See Interdepartmental Curriculum in Nutrition.)

Detailed information on graduate programs in Animal Science may be obtained from the Department of Animal Science.

Animal Science Courses****104.** Poultry Physiology and Incubation. (3)****105.** Poultry Management. (2)***107.** Applied Poultry Nutrition. (3)***108.** Poultry Products. (1)**110.** Beef Production. (3)**120.** Swine Production. (3)¹In College of Agriculture***Taught** 1970-71****Taught** 1971-72**123.** Special Readings in Animal Science. (Arr)**125.** Sheep Production. (3)**126.** Seminar. (1)**142.** Physiology of Reproduction. (3)**150, 151.** Animal Nutrition. (3, 3)**152.** Applied Animal Nutrition. (3)**155.** Animal Breeding. (3)**160.** Livestock Production Problems. (3)**165.** Livestock Judging and Selection. (3)**175.** Wool Technology. (3)**185.** Meats. (3)****210.** Techniques in Nutrition Research. (2-6)****214.** Advanced Animal Nutrition. (3)***215.** Nutritional Laboratory. (2)**220.** Special Problems in Animal Science. (Arr)**250.** Research and Thesis. (Arr)**261.** Animal Nutrition Seminar. (1)**262.** Animal Breeding Seminar. (1)**263.** Animal Management Seminar. (1)**264.** Animal Physiology Seminar. (1)**270.** Nutrition and Biochemistry Seminar. (1)**400.** Continuing Graduate Advisement. (3)

¹*Department of*

Applied Statistics - Computer Science

Head: Rex L. Hurst, PhD, Cornell University

Director of Graduate Program: Ronald V. Canfield, University of California at Davis

Office: Computer Science 132

Degree offered: MS

The department offers the MS degree in Statistics. Statistics is that branch of science which deals with developing tools of statistical inference; statistical inference is the inductive process of generalizing from the particular to the general on the basis of sample evidence. The foundation of statistical inference lies in the theory of probability which provides a measure of uncertainty of conclusions drawn from experimental data.

The experimental scientists of many fields of endeavor use statistics extensively as a tool of research because it provides means for summarizing large masses of data, estimating parameters, testing hypotheses, and formulating mathematical models to simulate physical biological situations.

Professor Ronald V. Canfield is in charge of the graduate program in the department. Either Professor Canfield or Dr. Hurst, head of the department, will be happy to provide further information.

Graduate Minor. A graduate minor in Statistics must fill University requirements as to total number of credit hours and must include one of the following: Ap St 176, 177, 178, or 261, 262, 263; or Math 161, 162, 163; and any two of the following: Ap St 221, 233, 240, 241, 281, 291, 292, or CS 245, 246.

Applied Statistics Courses

121. Statistical Methods for the Social Sciences. (4)
122. Statistical Methods for the Social Sciences. (4)
123. Statistical Methods for the Social Sciences. (4)
131. Statistical Methods. (4)
132. Statistical Methods. (4)
133. Statistical Methods. (4)
134. Design of Experiments. (4)
141. Sampling Methods. (3)
150. Computer Applications in Statistics. (3)
171. Statistical Theory for Research Workers. (3)
172. Statistical Theory for Research Workers. (3)
176. Introductory Theory of Statistics. (3)
177. Introductory Theory of Statistics. (3)
178. Introductory Theory of Statistics. (3)
198. Special Problems. (Arr)
199. Seminar. (1-3)
221. Industrial Statistics: Sampling Inspection. (3)
233. Biological Statistics. (3)
240. Applied Probability and Random Processes. (4)
241. Stochastic Processes. (3)
250. Computer Applications in Statistics. (3)
261. Intermediate Theory of Statistics. (5)
262. Intermediate Theory of Statistics. (5)
263. Intermediate Theory of Statistics. (5)
281. Sampling Design. (3)

¹In College of Science

- 291. Applied Experimental Design I. (3)
- 292. Applied Experimental Design II. (3)
- 293. Applied Experimental Design III. (3)
- 297. Thesis and Research. (Arr)
- 298. Special Problems. (Arr)
- 400. Continuing Graduate Advisement. (3)

Computer Science Courses

- 157. Programming Business Problems (FORTRAN). (3)
- 158. Programming Business Problems (COBOL). (3)
- 167. Programming Scientific Problems. (3)

- 171. Computer Programming. (3)
- 172. Computer Programming. (3)
- 175. Operations Research: Methods and Problems. (5)
- 178. Advanced Programming. (3)
- 181. Compiler Languages. (3)
- 182. Monitors and Systems Design. (3)
- 196. Special Problems. (Arr)
- 197. Seminar. (1)
- 245. Techniques in Operations Research. (3)
- 246. Techniques in Operations Research. (3)
- 400. Continuing Graduate Advisement. (3)

¹Department of

Art

Head: Harrison T. Groutage, MFA and additional graduate work,
University of Utah and State University of Iowa

Office: University Annex 205-A

Degrees offered: MA, MFA

Students are selected for the graduate program mainly on the basis of work in which an artistic individuality is *already evident* and which shows a level of development *beyond the need of classroom aid* or encouragement. Students are expected to be capable of prolonged and concentrated effort guided largely by goals and principles which they have already set for themselves.

The Master's program is mainly concerned with providing such individuals with the opportunity and encouragement for the further development of this self-direction. Students may choose to qualify for either the liberal Master of Arts degree or the more specialized and

professional Master of Fine Arts degree.

All graduate art students are urged to plan for participation in the annual Fine Arts tours of Europe, Spring Quarter in Mexico and Europe, and fall tours to San Francisco to visit the galleries, museums, and attend Broadway plays, San Francisco Opera, and other events.

MA Degree. This is the liberal studies degree in art at the graduate level. General requirements are listed in the graduate section of the General and Graduate Catalogs. Required in this degree is a proficiency in one or more foreign languages to be approved by the Department of Languages. Other departmental requirements are the same as numbers 1), 2), 3), 4),

¹In College of Humanities and Arts

5), 6), and 7) under the heading of **MFA Degree**.

MFA Degree. This is a specialized professional degree. In 1959 the College of Art Association of America approved the MFA degree rather than the PhD degree as the terminal degree in the studio arts. An exceptional student devoting full time might qualify after five quarters of residence for the degree; however, it generally requires an average of two years to satisfactorily complete this degree. The accumulation of credit hours and the number of quarters in residence are not major factors in the completion of this degree, but rather, the stature and significance of the individual creative and technical contribution made by the graduate student. However, minimum credit and resident hours must be completed. The following requirements are to be met:

1) A portfolio of original work clearly showing the student's present level of accomplishment in all art areas but more particularly in the area of his selected specialty, should be submitted for faculty evaluation prior to application for graduate work. A written or verbal report of the evaluation will be given the student with suggested courses of study. Courses required to correct any apparent deficiencies will not necessarily be counted as graduate credit.

2) No later than the end of the first quarter in residence, a committee will be appointed by the Art Department Chairman to supervise and assist with the student's graduate work. Also, near the end of the first quarter, the student will decide with the aid of his committee the direction his work will take and at that time formulate his Thesis Statement.

3) A complete written and illustrated record of all graduate proj-

ect work must be kept current for inclusion in a printed thesis or report. Details may be obtained from the graduate director of the Art Department.

4) At least one month prior to graduation the student must design a comprehensive exhibit of his graduate work and be responsible for its display. All paintings, drawings, photographs, or prints must be appropriately matted or framed. Sculpture and ceramics must be carefully displayed on suitable stands or in exhibit cases. Suggestions for the exhibit will be made by the student's graduate committee, but the candidate is solely responsible for the design and display of his show, which will be considered the important conclusion to his graduate work. A display area should be selected with the help of the committee chairman and reserved at least three months before exhibition time. All work to be shown in the exhibit should be selected with the help of the graduate committee, which will also recommend the time of the student exhibit.

Regardless of the number of credit hours accumulated or courses completed, the degree will be granted only on approval of the graduate committee.

5) At the discretion of the faculty, some work from the Master's exhibit may be selected for the University Permanent Collection.

6) Prior to the final oral examination, an adequate selection of labeled, colored 35mm slides of the Master's exhibit should be presented to the committee chairman. The slides will be retained in the Art Department as a permanent record of the graduate show.

7) Two quarters of successful work in the graduate seminar, 273, and one quarter of Philosophy 164 (Aesthetics) are required of all

MA and MFA degree candidates. Grades less than "B" will not be acceptable for graduate credit.

Because the MFA degree is highly individualized, the student should consult the department or his graduate committee for more detailed information on requirements.

Art Courses

101. Contemporary European Arts and Crafts. (3)
103. High Renaissance Art. (3)
104. Life Drawing. (3)
105. Advanced Drawing and Composition. (3)
106. Drawing Studio. (Arr)
109. Landscape Painting. (3)
110. Modern European Painting. (3)
111. Watercolor and Related Media. (3)
112. Portrait Painting. (1)
113. Watercolor Studio. (Arr)
114. Fabric Design. (Dye Technique) (3)
115. Fabric Design. (Paint Technique) (3)
116. Fabric Design. (Structural) (3)
117. Fabric Design Studio. (Arr)
118. Creative Stitchery. (3)
119. Metalsmithing. (3)
120. Jewelry Casting. (3)
121. Jewelry and Metalism Studio. (Arr)
127. Painting Studio. (Arr)
128. Photography Studio. (Arr)
130. Ceramic Hand Building Techniques. (Arr)
131. Glaze Calculation. (3)
132. Ceramic Studio. (Arr)
136. Art Photography. (3)
137. Art Photography. (3)
138. Art Photography. (3)
140. Applied Interior Design. (3)
142. Interior Design Studio. (Arr)
143. Advanced Problems in Interior Design. (3-5)
144. Interior Design Apprenticeship. (1-5)
151. Art Methods for Elementary Grades. (3)
152. Art Methods for High School. (3)
- 153-154. Art Education Workshop. (1-5)
157. Photography for Publication. (3)
160. Advanced Sculpture. (3)
163. Sculpture Studio. (Arr)
164. Photo Illustration. (5)
165. Advanced Photo Portraiture. (5)
166. Advanced Fabric Design in Weaving. (3-5)
167. Color Printing. (3)
168. Advanced Publications Photography. (5)
169. Spinning and Dyeing. (3)
170. Photography Laws and Regulations. (1)
- 171 and 271. Special Studio Courses. (Arr)
181. Advanced Lettering. (3)
182. Advanced Advertising Design. (3)
183. Advanced Illustration. (3)
184. Commercial Art Studio. (3)
185. Advanced Architectural Rendering. (3)
191. Woodcut. (3)
192. Serigraph. (3)
193. Lithography. (3)
194. Intaglio. (3)
195. Printmaking Studio. (Arr)
164. Aesthetics. (See Philosophy 164)
206. Drawing Studio. (Arr)
210. Thesis Photo Problems. (1)
213. Watercolor Studio. (Arr)
217. Fabric Design Studio. (Arr)
221. Jewelry and Metal Studio. (Arr)
227. Painting Studio. (Arr)
228. Photo Studio. (Arr)
232. Ceramic Studio. (Arr)
243. Problems in Interior Design. (Arr)
263. Sculpture Studio. (Arr)
272. Art Research. (Arr)
273. Art Seminar. (1)
284. Commercial Art Studio. (Arr)
295. Print Studio. (Arr)
400. Continuing Graduate Advisement. (3)

¹Department of

Bacteriology and Public Health

Head: Rex S. Spendlove, PhD, Ohio State University

Office: Plant Industry 309

Degrees offered: MS, PhD

The Department of Bacteriology and Public Health is presently housed in the Plant Industry building, but will move into a new building scheduled for completion in January 1971. The laboratories in the department are well equipped for research and training in both applied and theoretical areas.

Master of Science in Bacteriology. This degree combines a substantial research effort with a rounding out of the course work in Bacteriology and related subjects. At the conclusion of the Master's degree, the student is expected to have completed those Bacteriology and related courses designated by the candidate's committee.

Doctor of Philosophy in Bacteriology. This degree is primarily a research degree. A doctoral thesis comprising an intensive and definitive contribution to knowledge is the most basic requirement. In previous training or in the doctoral program the student is expected to have completed course work appropriate for the student's specialization as determined by the candidate's committee. As supporting courses, microbiologists commonly take advanced courses in Biochemistry, Genetics, Ecology, or another suitable specialty.

Moreover, the candidate must present evidence of a satisfactory command of one foreign language or competence in another discipline deemed necessary to prepare him properly for research or teaching.

This requirement should be completed one year before the thesis is presented.

Bacteriology Courses

- 104. Dairy Bacteriology. (3)
- 105. Dairy Bacteriology Laboratory. (2)
- 110. Soil Microbiology. (2)
- 120. Food Microbiology. (2)
- 121. Food Microbiology Laboratory. (2)
- 160. Pathogenic Bacteriology. (5)
- 168. Immunology. (5)
- 170. Virology. (5)
- 180. Bacterial Physiology. (4)
- 192. Aquatic Microbiology. (4)
- 198. Undergraduate Problems Course. (1-3)
- 210. Advanced Soil Biochemistry and Microbiology.
- 211. Genetics of Lower Organisms. (3)
- 285. Microbial Biosynthesis. (3)
- 291. Seminar. (1)
- 294. Special Problems in Bacteriology. (Arr)
- 299. Thesis Research. (Arr)
- 400. Continuing Graduate Advisement. (3)

Public Health Courses

- 140. Workshop in Nursing Home Administration. (1)
- 149. Current Problems in Community Health. (2)
- 150. Environmental Sanitation. (4)
- 152. Family Health. (3)
- 154. School Health Program. (4)
- 155. Health Education for Teachers. (3)
- 159. Public Health Laboratory Methods. (3-5)
- 254. Special Problems in Public Health. (Arr)
- 400. Continuing Graduate Advisement. (3)

¹In College of Science

¹*Department of*

Botany

(Cytogenetics, Plant Pathology, Plant Physiology,
Taxonomy, Virology)

Head: Orson S. Cannon, PhD, Cornell University; postdoctoral work,
Oregon State University

Office: Plant Industry 204

Degrees offered: MS, PhD

Master of Science Degree. The Department of Botany offers the MS degree in the following specialized fields: Cytogenetics, Plant Ecology, Plant Pathology, Plant Physiology, Phycology, Taxonomy, Virology. The opportunities and facilities for research in these fields are greatly augmented through the cooperation of the USU Agricultural Experiment Station, United States Department of Agriculture, and the Intermountain Herbarium.

In most cases a candidate must submit a thesis on a topic within the field of his major subject; however, with the approval of the major professor, the thesis alternate, Plan B, may be substituted for the thesis if the candidate's primary aim is preparation for teaching with the Master's degree.

Doctor of Philosophy Degree. The Department of Botany, in cooperation with related departments offers the degree of PhD in the specialized fields of Plant Ecology, Plant Pathology, Plant Physiology, Taxonomy, and Virology. Detailed information may be obtained from the department.

Herbarium. Graduate study in plant taxonomy offered in the Department of Botany utilizes the extensive facilities of the Intermountain Herbarium. Most plant species that grow in Utah and the

intermountain region are represented in the herbarium.

Botany Courses

- 102. Taxonomy of Vascular Plants. (5)
- *104. Evolution of Cultivated Plants. (3)
- 108. Agrostology. (4)
- 112. Aquatic and Marsh Plants. (4)
- 116. Microtechnique. (5)
- 117. Anatomy. (5)
- 118. Cytogenetics. (5)
- 120. Elementary Plant Physiology. (5)
- **121. Water Relations of Plants. (3)
- *125. Morphology of Vascular Plants. (5)
- 130. Principles of Plant Pathology. (5)
- *140. Forest Pathology. (4)
- 150. Mycology, Comparative Morphology and Nuclear Behavior of the Fungi. (5)
- 160. Fresh-Water Algae. (4)
- 200. Evolutionary Ecology. (3)
- 210. Plant Geography. (3)
- *212. Advanced Plant Taxonomy. (4)
- *224. Plant Growth and Development. (3)
- 225. Mineral Nutrition of Plants. (4)
- *226. Plant Virology. (5)
- **227. Plant Respiration and Metabolism. (4)
- *228. Photosynthesis in Higher Plants. (4)
- *230. Field Plant Pathology. (3)
- 234. Special Problems. (Arr)
- 240. Botany Seminar. (1)
- 241. Plant Physiology Seminar. (1)
- 250. Research. (Arr)
- 400. Continuing Graduate Advisement. (3)

*Taught 1970-71

**Taught 1971-72

¹In College of Science

¹*Department of*

Business Administration

Head: Howard M. Carlisle, MS, University of Wisconsin; doctoral work, University of California

Director of MBA Program: John R. Cragun, PhD, Purdue University

Office: Business 811

Degree offered: MBA

Master of Business Administration. This degree program is not directed at specialization in one of the functional areas of business. It is a general management program designed to develop potential business leadership. Training in the behavioral aspects of administration and in the newer quantitative tools is emphasized. The program provides small classes, personal contact with professors, significant individual flexibility, and individual development through the case study and business gaming techniques.

Programs Offered. The MBA degree program is open to any qualified graduate student regardless of his undergraduate major. Two-year and one-year programs are offered. The two-year program is for undergraduate majors in disciplines other than business and consists of approximately 90 credit hours. To the extent that a student has had appropriate business experience or has taken appropriate course work, a full two years may not be required. The one-year program is for undergraduate majors in business and consists of approximately 45 credit hours. The one-year program is the same as the second year of the two-year program.

Curriculum. The first year (Basic Program) of the two-year program serves to prepare the student

for the Advanced Program. The courses involved in the Basic Program are: BA 131, 132, 133, 134, 149, 151, 171, 181, 204; Acct 209, 210; Econ 100, 101. (Prerequisites to the Basic Program are College Algebra and Introduction to Mathematical Analysis, or equivalent.) A student previously trained in any of these areas will be exempted (with the approval of the Director of the MBA Program) from taking course work in the Basic Program which duplicates prior training or experience.

The courses in the Advanced Program are: BA 212, 218, 230, 231, 232, 235, 240, 249, 250, 251, 271, 281, 291, 292, 293, 294; Acct 241; Econ 208. Options for Advanced Program Research (nine credit hours required) are: 1) thesis or two reports, BA 290, or 2) course work substitute: BA 230, 231 (or 232) and one additional course from the Advanced Program. If the student selects the course work substitute, his work is directed by his class instructors rather than his supervisory committee. A student selecting the first option may take the Business Research Methods course, but he is not permitted to register for the Business Problems courses.

Of the 45 minimum credit hours required for the degree, a student must complete at least 27 credit hours from the above list of Advanced Program courses, in addition to one of the research options.

¹In College of Business

Electives. Up to nine credit hours of electives are permitted in the Advanced Program, with the approval of the student's adviser and the Director of the MBA Program. Electives are approved in instances where a student has a desire for specialization and where an acceptable program can be arranged. Electives can be substituted for certain of the courses indicated above.

Admission Requirements and Procedures. Admission qualifications are the same as those listed in Part I of this bulletin. Scores from the Admission Test for Graduate Study in Business (ATGSB) are required. In addition, personal interviews with faculty representatives may be required. Formal application should be made to the School of Graduate Studies. The deadline for application for Fall Quarter is August 1.

Adviser and Supervisory Committee. In general, the Director of the MBA Program will serve as the student's adviser as far as course work is concerned. If the student selects the thesis option, a supervisory committee will be appointed at the time the subject(s) is (are) approved. The responsibility of the committee will be to approve the student's application for candidacy, advise on research, and conduct the final oral examination. If the student elects to take the course work substitute, a supervisory committee will be appointed when the student enrolls in his Business Problems class. The committee will normally include the faculty member instructing this class as well as two other staff members. The responsibility of the committee will be to approve the student's application for candidacy and to conduct the final oral examination.

Examinations. All students will be required to pass the following two examinations: 1) a comprehensive written examination after he has successfully completed 27 or more credit hours from the advanced program; students must answer questions from five of eleven subareas contained in the examination; 2) a final Master's examination conducted by the student's supervisory committee; the examination typically covers the content of the student's research and other subject matter as considered appropriate by the examining committee.

Financial Assistance. Graduate assistantships and fellowships are available to outstanding students. The University Research Fellowships are granted by the School of Graduate Studies. Graduate assistantships are awarded by the Department of Business Administration and generally range between \$1000 and \$2000 for nine months, depending on the time the recipient devotes. Application for the assistantships must be made by March 1 to the Head of the Department of Business Administration. A formal application for admission must be submitted to the School of Graduate Studies at the same time as the application for an assistantship. A recipient of a graduate appointment is eligible for a waiver of the out-of-state portion of his tuition.

Business Administration Courses

- 113. Business Simulation. (2)
- 118. Procedure Development. (3)
- 119. Accounting Systems and Automation. (3)
- 131. Business Statistics. (3)
- 132. Business Statistics. (3)
- 133. Management Concepts. (4)

134. Production. (5)
136. Procurement and Production Control. (5)
138. Quantitative Methods for Production Management. (4)
140. Insurance. (3)
141. Real Estate. (3)
142. Advanced Problems in Real Estate. (3)
145. Management of International Operations. (3)
149. Business Policy. (5)
150. Managerial Accounting. (5)
151. Fundamentals of Marketing. (5)
157. Consumer Behavior. (3)
158. Quantitative Techniques for Marketing. (3)
159. Marketing Research. (4)
161. Retailing. (4)
162. Sales Management. (3)
163. Industrial Marketing. (3)
165. International Marketing. (3)
166. Advertising. (4)
169. Marketing Management. (4)
171. Personnel Administration. (5)
174. Employment Practices. (3)
175. Wage and Salary Administration. (3)
178. Problem Personnel and Industrial Relations. (3)
180. Financial Institutions. (3)
181. Corporation Finance. (5)
182. Problems in Finance. (3)
185. Investments. (3)
186. Security Analysis. (3)
204. Survey of Business Law. (3)
212. Administrative Control. (3)
218. Computer and Systems Management. (3)
230. Business Research Methods. (3)
231. Business Problems I. (3)
235. Quantitative Methods in Business. (3)
240. Free Enterprise and Public Policy. (3)
249. Advanced Business Policy. (3)
250. Managerial Economics. (3)
251. Advanced Marketing Problems. (3)
271. Human Aspects of Administration. (3)
281. Advanced Finance Problems. (3)
290. Thesis. (Arr)
291. Seminar in Management Theory. (3)
292. Seminar in Labor Relations. (3)
293. Seminar in Social Responsibility. (3)
294. Organizational Behavior. (3)
295. Independent Research and Reading. (Arr)
400. Continuing Graduate Advisement. (3)

*College of***Business**

Dean Robert P. Collier

Assistant Dean William V. Tezak

Office in Business 202-210

The College of Business has the following departments, majors, and degrees:

Accounting—Accounting; BA, BS, MAcct

Aerospace Studies — ROTC Commission

Business Administration — Finance, Marketing, Personnel and Industrial Relations, Production Management; BA, BS, MBA

Business Education and Office Administration — Composite in Business Education, Composite in Distributive Education, Office Administration, Combination of Office Administration and Family Life; BA, BS, MS, EdD

Economics — Economics, Agricultural Economics; BA, BS, MA, MS, PhD

Military Science—ROTC Commission

The American economy today provides an unusual opportunity for enterprising managers and businessmen. In a free enterprise economy such as ours, the decisions of the business world are made by individual managers, administrators, and owners of business. The very course of our national progress and prosperity is determined by the decisions and actions of businessmen. As never before, we need leadership in this area. We are currently challenged by an alternative approach—total-

itarian state planning. We are beset by many economic and business problems—inflation, lack of growth, etc. If our system is to survive and grow, dynamic, imaginative leadership is needed in the business world; and great rewards await those who can provide this leadership.

The program offered in the College of Business combines highly specialized training in many professions, i.e., auditing, accounting, financial management and the like, with many broad, general, educational programs important to all people. All Business majors are required to take at least 40 percent of their course work outside of this college in areas such as social science, psychology, mathematics, physical sciences, humanities, etc., to insure a broad and varied background. To guarantee the desired amount of specialization, all majors in this college are required to complete a required core curriculum and at least 40 percent of their total program within the college in Business and Economics. This is intended to provide a balance between broad-gauge general education and the specialization required for success in the business world.

The purpose of the College of Business is to provide an education that is practical and realistic, preparing men and women to take an active part in the main stream

Business Education curriculum coordinators or supervisors, and college teachers. For additional information, write to the head of the department or the Chairman of the Doctor of Education Committee in Curriculum Development and Supervision in the College of Education.

Business Education Courses

- 150. Philosophy of Distributive Education. (3)
- 155. Methods of Teaching DE and Cooperative BE. (3)
- 178. Methods of Teaching Business — non-skilled. (3)
- 179. Methods of Teaching Typewriting and Office Practice. (3)
- 180. Methods of Teaching Shorthand and Transcription. (3)
- 185. Managing Personal Finances. (5)
- 189. Principles of Business Education. (3)
- 210. Improvement of Instruction in Typewriting. (3)
- 220. Improvement of Instruction in Shorthand and Transcription. (3)
- 225. Adult Programs in Business Education. (3)
- 230. Improvement of Instruction in Bookkeeping and Accounting. (3)
- 235. Improvement of Instruction in Distributive Education. (3)

- 240. Improvement of Instruction in Basic Business. (3)
- 245. Cooperative Programs in Business Education. (3)
- 250. Issues and Trends in Business Education. (3)
- 255. Office Technology. (3)
- 260. The Business Curriculum. (3)
- 262. Evaluation of Business Education. (3)
- 264. Implementation of Business Education. (3)
- 266. Philosophy of Vocational Business Education. (3)
- 267. Supervised Work Experience. (Arr)
- 268. Vocational Team Teaching. (Arr)
- 270. Workshop in Business Education. (1-6)
- 271. Workshop in Business Education. (1)
- 272. Workshop in Business Education. (2)
- 273. Workshop in Business Education. (3)
- 280. Seminar in Business Education. (3)
- 290. Research in Business Education. (Arr)
- 295. Independent Research and Reading. (Arr)
- 400. Continuing Graduate Advisement. (3)

Office Administration Courses

- 167. Office Practice. (2)
- 175. Office Management. (3)
- 186. Secretarial Procedures. (3)

Department of

Chemistry

Head: Garth L. Lee, PhD, University of Toronto

Office: Maeser Hall

Degrees offered: MS, PhD

Entrance Examinations. All new graduate students must take entrance examinations in Inorganic, Physical, Organic, and Analytical Chemistry. These will be ad-

ministered before registration day in the Fall Quarter and by special arrangement at other times.

Master of Science Degree. The Chemistry Department offers the MS degree with research in any of

¹In College of Science

the following fields: Inorganic, Physical, Organic, Analytical, and Biological Chemistry.

Four graduate programs leading to an MS or a PhD degree are available in cooperation with other departments. (See Interdepartmental Curriculum in Nutrition, Interdepartmental Curriculum in Food Science and Technology, and Interdepartmental Curriculum in Toxicology.)

Doctor of Philosophy Degree.

The Chemistry Department offers advanced study and research in Inorganic, Physical, Organic, Analytical and Biological Chemistry leading to the PhD degree in Chemistry. Before admission to candidacy the student must fulfill the following requirements: 1) perform satisfactorily in a core curriculum of courses, 2) demonstrate a reading comprehension of German or Russian, 3) pass a comprehensive examination, written and oral, in a field of specialization, and 4) present an acceptable statement of a thesis research problem. The student should consult the department head concerning other requirements.

Chemistry Courses

- 116. Inorganic Preparations. (Arr)
- 134. Qualitative Organic Analysis. (4)
- 150. Inorganic Chemistry. (4)
- 153. Instrumental Analysis. (3)
- 180. Elementary Biochemistry. (5)
- 190. Principles of Biochemistry. (5)
- 191, 192. Principles of Biochemistry. (3, 3)
- 193, 194. Biochemistry Laboratory. (2, 2)
- 195. General Pharmacology. (5)
- 201. Quantum Chemistry. (3)
- 202. Molecular Spectroscopy and Structure. (3)
- 203. Chemical Kinetics. (3)
- *204. Chemical Thermodynamics and Statistical Mechanics. (3)
- *205. Chemical Thermodynamics and Statistical Mechanics. (3)
- *206. Chemical Thermodynamics and Statistical Mechanics. (3)
- 209. Special Topics in Physical Chemistry. (3)
- 225, 226, 227. Advanced Organic Chemistry. (3, 3, 3)
- 228. Physical Organic Chemistry. (3)
- 229. Theoretical Organic Chemistry. (3)
- **233. Special Topics in Organic Chemistry. (3)
- *234. Chemistry of Natural Products. (3)
- 250. Advanced Inorganic Chemistry. (3)
- **251. Coordination Chemistry. (3)
- 260. Graduate Seminar. (1)
- 272. Advanced Analytical Chemistry. (3)
- 274. Special Topics in Analytical Chemistry. (3)
- 280. Toxicology. (5)
- 286. Biochemical Research Techniques. (Arr)
- *287. Nucleic Acids and Proteins. (3)
- 288. Special Topics in Biochemistry. (2)
- 289. Animal Metabolism. (Arr)
- *295. Enzymes. (3)
- *296. Enzyme Chemistry Laboratory. (2)
- 298. Graduate Research. (Arr)
Nutrition Seminar. (See Animal Husbandry 270.)
- 400. Continuing Graduate Advisement. (3)

*Taught 1970-71

**Taught 1971-72

¹*Division of*

Biochemistry

Chairman: Bruce F. Burnham, PhD, University of California, Berkeley
Office: Maeser Hall

The primary objective of graduate study in Biochemistry is the attainment of significant accomplishment in some specialized field of biochemical research and a professional level of over-all competence in the subject matter of biochemistry. Graduate study in the area of Biochemistry is administered through the Division of Biochemistry, Department of Chemistry.

No set of formal courses is required of a prospective candidate in reaching the objectives of graduate study stated above. In most cases the student will find it advisable to follow a broad schedule of classes in preparing for Comprehensive Examinations. During the period when the student is seeking a degree, he is expected at all times to pursue independent reading, study, and research beyond the range of formal assignments and is expected to attend and participate in departmental seminars.

Admission Procedure and Standards. A student must first be accepted by the School of Graduate Studies. To be admitted for graduate study a student must have a Bachelor's degree from a recognized institution. A grade average of "B" in undergraduate science courses is the minimum acceptable scholastic performance. The student should, as an undergraduate, have completed one-year sequences in General, Organic, and Physical Chemistry; Mathematics through Calculus; General Physics; and the equivalent of one year in the biological sciences, e.g., Zoology, Bot-

any, Genetics, Microbiology.

Entrance Examinations. Each student who is admitted to graduate study without restriction must take two examinations: 1) the Graduate Record Examination including the advanced test in Biology which is administered by the Graduate School, and 2) an Entrance Examination which is administered by the Chemistry Department in two fields of Chemistry (Organic and Physical) at the Bachelor of Science level.

Master of Science Degree. The Biochemistry Division of the Department of Chemistry offers advanced study and research leading to the degree Master of Science in Biochemistry. Before completion of this degree, the student must fulfill the following requirements:

- 1) Make up any deficiencies revealed by the entrance examinations.
- 2) Meet course credit requirements for the MS outlined by the School of Graduate Studies.
- 3) Conduct research and write a thesis that is acceptable by the student's supervisory committee.
- 4) Pass a final oral examination which will consist primarily of a defense of the research and thesis.

Doctor of Philosophy Degree. The Biochemistry Division of the Department of Chemistry offers advanced study and research leading to the degree of Doctor of Philosophy in Biochemistry. Before admission to candidacy, the student must fulfill the following requirements:

- 1) Make up any deficiencies revealed by the entrance examinations.

¹In the Department of Chemistry, College of Science

2) Pass a language examination, administered by the Graduate School in either German, French, or Russian.

3) Pass a comprehensive examination, written and oral, in Biochemistry. This must be done no

later than one academic year before the final examination on the thesis.

4) Present a statement of the thesis problem that is acceptable to the student's supervisory committee.

¹Department of

Civil Engineering

Head: Elliot Rich, PhD, University of Colorado; registered professional engineer and land surveyor

Office: Engineering L-162

Degrees offered: MS, PhD

This department offers the MS degree in most Civil Engineering fields and the PhD degree in Fluid Mechanics, Soil Mechanics, Water Resources, Hydrology, Hydraulics, Structures, and Water Quality.

All graduate students who desire to take any graduate level Fluid Mechanics courses must either take CE 143 or pass the Fluid Mechanics diagnostic examination. This examination will be given immediately after registration for Fall Quarter and will cover Elementary Fluid Mechanics.

Structural Engineering. Bridges, buildings of ordinary and unusual nature, structures for aircraft and space industries, and for a great variety of other purposes all depend on the structural engineer for their design.

The foundation for Structural Engineering is Mathematics, Engineering Mechanics, Mechanics of Materials, and Properties of Materials. This is reinforced with knowledge and experience obtained in design courses.

At a higher level, structural engineers study Theoretical and Applied Mechanics and Mathematics as a basis for the analysis and design of complex structural forms.

Soil Mechanics. Engineering studies of soils are concerned with the ability of soils to support structures, roadways and runways, and with the economic application of engineering design to foundations. This science is relatively new, but has developed to a point where no engineer or architect can ignore the problems of investigating properties of soils in connection with engineering construction. Undergraduate and graduate courses offered by the Soil Mechanics division of Civil Engineering provide the basic knowledge necessary for the design of foundations and acquaint the student with the methods and techniques required to assure safe construction of engineering projects. The program emphasizes fundamental concepts and practical ideas so that the student will be properly trained for his initial job, as well as being

¹In College of Engineering

prepared to understand future development in this field.

Engineering Materials. Effective utilization of the elements of production, space exploration, and civil works and the expanding demand for more impressive bridges, buildings, highways, canals, and dams requires modern engineering materials of increasingly high quality and sophistication. Since materials may represent a large share of the cost of a project, effective and efficient use of materials is of paramount importance.

It is the objective of materials engineering to develop effective use of available materials, to take advantage of all new knowledge, and, through research and development, contribute to the technical knowledge available. Frequent contributions are made in national and international conferences and publications.

Water Engineering. Never in the history of our country has there been more concern with water. Continuing and conflicting demands for water require that the engineer today be trained to handle highly complicated water situations.

USU has a long tradition of training and research in the varied and extensive aspects of water resource development and use. It has developed a well-balanced program, expanded and oriented to provide the training needed to cope with impending water problems of this country and of the world. Teaching and research staff and facilities are continually expanding. A new Engineering Building with modern and well-equipped laboratories was completed in 1965.

The broad scope of water resources engineering is amply provided in a rich offering of "water" courses in the College of Engineer-

ing. Through interdisciplinary collaboration, many excellent course offerings are available in other colleges. A long and continuing tradition of international collaboration in water resource work gives breadth and flavor to the overall programs. The course offerings in the Agricultural and Irrigation Engineering Department make it possible to enrich each of the following Water Engineering programs.

Water Resources Engineering and Hydrology. Hydrology is a fundamental discipline which provides the underpinning for the orderly and unified solution of most water problems.

This hydrologic foundation must be translated into policies, plans, and procedures for optimum development utilization of the available water supply. Hydrologic considerations must be blended with a substantial body of other engineering, economic, legal, and social information in the formulation of comprehensive multiple-purpose plants. The problems encountered by the water resource engineer require ingenuity, imagination, and skill in engineering applications.

Considerable flexibility in the arrangement of degree programs is permitted in this field. Those with particular interest in scientific or applied hydrology or in water resources administration, planning, and management may supplement the strong core of offerings in the Civil Engineering Department by choosing from more than 130 approved courses in the Departments of Mathematics, Statistics, Computer Science, Economics, Political Science, Public Administration, Geology, Electrical Engineering, Agricultural Engineering, Plant Science, Soils and Meteorology, Botany, Sociology, Forest, Range and Wildlife Man-

agement, and Bacteriology and Public Health.

Hydraulic Engineering. Hydraulic Engineering at USU encompasses the theory of Fluid Mechanics and its application in a variety of engineering fields. Fluid Mechanics, based on universally valid theorems of energy and momentum, and recognizing no arbitrary boundaries between fields of engineering knowledge, forms a logical core for the Water Engineering Program. Various specialties in Water Engineering draw heavily on the fundamentals of Fluid Mechanics in the solution of hydrology, irrigation, drainage, municipal water and sewerage, and other hydraulic design problems.

A good variety and balance of courses in Theoretical Fluid Mechanics and Hydraulic Design are available at the upper division and graduate level.

Water Quality Engineering. Within the hydrologic cycle, a relatively fixed supply of water is available for beneficial use. Today's demands for water exceed this available supply. Tomorrow's ever-increasing demands indicate that multiple reuse of water is inevitable, thus water quality control considerations become of paramount importance.

The goal of water quality engineering becomes that of altering or upgrading quality to a level appropriate to the intended use. Water quality changes are accomplished by engineered systems, which include a concern for minimum cost consistent with health, safety, and product requirements.

The graduate program in Water Quality Engineering is based on the study of fundamental considerations and principles necessary for a rational approach to design and application. In addition to the

excellent complementary engineering offerings in Water Resources, Hydrology, and Hydraulics, strong interdisciplinary emphasis is given in the fields of Chemistry, Biology, Mathematics, and Economics.

Irrigation and Drainage Engineering. See Agricultural and Irrigation Engineering.

Civil Engineering Courses

104. Structural Mechanics—Determinate. (4)
105. Structural Mechanics—Hyperstatic. (4)
106. Structural Concrete Design. (4)
107. Structural Steel Design. (3)
108. Structural Synthesis and Design. (3)
109. Computer Structural Analysis. (3)
120. Highway Engineering. (3)
121. Highway Engineering. (3)
122. Traffic Engineering and Urban Planning. (3)
128. Engineering Materials. (3)
129. Engineering Materials. (3)
130. Construction Cost Estimating. (3)
- 140, 141. Fluid Mechanics and Hydraulics. (3, 3)
143. Fluid Mechanics and Hydraulics. (4)
150. Soil Mechanics. (3)
151. Soil Engineering. (3)
152. Foundation Analysis and Design. (3)
172. Water Resources Engineering — Hydraulics. (4)
173. Water Resources Engineering—Hydrology. (4)
174. Water Resources Engineering—Water Quality. (3)
181. Photogrammetry. (3)
182. Route Surveying. (2)
190. Engineering Economy. (3)
191. Water Quality Analysis. (4)
192. Aquatic Microbiology. (4)
193. Municipal Water Supply and Waste Water Disposal. (4)

195. Legal Aspects of Engineering. (3)
199. Special Problems in Civil Engineering. (3)
201. Structural Optimization and Special Topics. (3)
202. Structural Matrix Analysis. (3)
203. Limit Analysis of Structures. (3)
207. Elastic Stability. (3)
208. Theory of Plates. (3)
209. Theory of Shells. (3)
210. Earth and Rockfill Dams. (3)
211. Masonry Dams. (3)
212. Appurtenances to Dams and Operation of Reservoirs. (3)
215. Hydraulic Transients. (3)
216. Numerical Methods in Fluid Mechanics. (3)
220. Asphalts and Asphalt Mixtures. (3)
221. Principles of Pavement Design. (3)
222. Highway Planning and Economics. (3)
228. Advanced Concrete Engineering. (3)
240. Advanced Fluid Mechanics Lab and Instrumentation. (2-4)
241. Intermediate Fluid Mechanics. (4)
242. Open Channel Flow. (4)
243. Advanced Hydraulic Design. (3)
246. Porous Media Flow. (3)
250. Advanced Soil Mechanics. (3)
251. Advanced Soil Mechanics Laboratory. (3)
255. Sediment Transport and Alluvial Channel Flow. (3)
260. Similitude. (3)
262. Water Resources Engineering Systems. (3)
263. Water Resources Engineering Institutions. (3)
264. Water Resources Engineering Planning. (3)
265. Directed Reading and Special Studies in CE. (Arr)
266. Hydrologic Methods. (3)
267. Flood Hydrology. (3)
268. Ground Water Hydrology. (3)
- 270, 271, 272. Advanced Fluid Mechanics. (3, 3, 3)
273. Special Problems in Civil Engineering. (Arr)
275. Snow Pack Management. (3)
276. Snow Hydrology. (3)
283. Water Resource Systems Engineering and Simulation. (4)
291. Waste Management. (3)
292. Air Quality Management. (3)
293. Water Quality Management. (3)
- 294, 295, 296. Water and Waste Water Treatment: Theory and Design. (3, 3, 3)
297. Industrial Wastewaters. (2)
298. Graduate Thesis. (Arr)
299. Graduate Seminar. (1)
400. Continuing Graduate Advisement. (3)

¹Department of

Clothing and Textiles

Head: Anne P. Kernalleguen, PhD, Utah State University

Office: Family Life 303

Degrees offered: MS, PhD

Master of Science Degree. The Clothing and Textiles Department offers study and research to qualify for all MS degrees with em-

phasis in the areas of clothing design, or the socio-psychological aspects of clothing.

Doctor of Philosophy Degree. Advanced study and research are

¹In College of Family Life

available leading to the PhD degree in the Behavioral Science Aspects of Clothing and Textiles. To fulfill the requirements for the degree, the student must 1) demonstrate a reading comprehension of one foreign language, 2) pass a comprehensive examination in the field of specialization and in the minor field of Psychology or Sociology and Anthropology, 3) successfully complete a research problem and a satisfactory dissertation. The student should consult the head of the department concerning specific requirements.

Clothing and Textiles research staff and graduate students are affiliated with the Institute for Research on Man and His Personal Environment. This institute was established in 1967 and provides opportunities for research study of man as a totality with respect to his physical, social, and psychological response to his man-made environment, particularly clothing, textiles, home furnishings, and housing.

Clothing and Textiles Courses

106. Behavioral Science Aspects of Clothing. (3)
114. Fashion Illustration. (3)
115. Fashion Design. (3)
135. History of Costume and Textiles. (5)
140. Draping. (3)
170. Flat Pattern Designing. (3)
174. Advanced Textile Problems. (3)
180. Tailoring. (3)
186. Fashion Analysis. (3)
204. Economics of Clothing and Textiles. (3)
205. Consumer Behavior in Clothing and Textiles. (3)
206. Advanced Behavioral Science Concepts in Clothing. (3)
208. Cultural Bases of Clothing. (3)
210. Personality Projection through Clothing. (3)
280. Graduate Seminar: Clothing and Textiles in Education. (2)
281. Graduate Seminar: Esthetic Aspects of Dress. (2)
282. Graduate Seminar: Textiles. (2)
290. Independent Study. (Arr)
291. Graduate Seminar: Current and Special Topics. (2)
293. Research Methods. (3)
294. Research Colloquium. (1)
295. Research and Thesis. (Arr)
400. Continuing Graduate Advisement. (Arr)

¹Department of

Communicative Disorders

Head: Jay R. Jensen, PhD, University of Wisconsin

Office: Mechanical Arts 202

Degree offered: MS

The Department of Communicative Disorders offers an MS degree with emphasis in Clinical Audiology, Educational Audiology, or Speech Pathology. A student who desires a graduate degree must have completed the undergraduate major requirements or their equivalent before beginning his gradu-

ate program. The graduate program prepares a student for professional certification and employment in the area of specialization.

A candidate may elect either a thesis option program or a non-thesis (Plan B) program. The characteristic curriculum for a thesis program will include a minimum of 45 credit hours of which a maximum of nine hours may be

¹In College of Humanities and Arts

thesis credit. The Plan B program characteristically includes a minimum of 45 credit hours of which four may be taken for the Plan B report.

Financial Assistance. Limited support is available to graduate students and is awarded on a competitive basis. Among current sources of support are the following: U.S. Office of Education Graduate Fellowships \$2200 per year plus tuition and fees and dependency allowance; Social and Rehabilitation Administration \$2400 per year plus tuition and fees. Students requesting graduate support should apply to the department by March 1.

Communicative Disorders Courses

- 110. Fundamental Anatomy of Speech and Hearing. (5)
- 120. Speech Pathology I. (5)
- 125. Speech Pathology II. (5)
- 130. Methods in Speech Therapy. (2)
- 135a. Clinical Practicum—Speech Pathology. (Arr)
- 135b. Clinical Practicum—Audiology. (Arr)
- 135c. Clinical Practicum—Educational Audiology. (Arr)
- 145. Stuttering. (3)
- 150. Audiology I. (5)
- 155. Audiology II. (3)
- 160. Audiology III. (3)
- 170. Speech for the Hearing Impaired. (3)
- 172. Language for the Hearing Impaired I. (3)
- 174. Language for the Hearing Impaired II. (3)
- 176. Language for the Hearing Impaired III. (3)
- 178. The Young Hearing Impaired Child. (3)
- 180. Dactylogy. (2)
- 190. Problems in Audiology-Speech Pathology. (Arr)
- 220a. Seminar in Communication Science. (2)
- 220b. Seminar in Speech Pathology. (2)
- 220c. Seminar in Audiology. (2)
- 220d. Seminar in Educational Audiology. (4-8)
- 225. Diagnostic Methods in Speech Pathology. (3)
- 230. Medical Background in Speech Pathology and Audiology. (4)
- 235a. Clinical Practicum—Speech Pathology. (Arr)
- 235b. Clinical Practicum—Audiology. (Arr)
- 235c. Clinical Practicum—Educational Audiology. (Arr)
- 240. Public School Clinical Practicum. (4-8)
- 250. Experimental Phonetics. (3)
- 260. Pediatric Audiology. (3)
- 270. Speech Reading. (3)
- 275. Auditory Training. (3)
- 276. Communication Problems in the Hard of Hearing. (2)
- 290. Research Studies. (Arr)
- 295. Thesis. (Arr)
- 296. Case Study Thesis. (Arr)

¹*Department of*

Dairy Science

Head: George E. Stoddard, PhD, University of Wisconsin

Office: Animal Industry 106

Degrees offered: MS, PhD (Interdepartmental Curriculum in Nutrition)

The Dairy Science Department offers an MS degree in Dairy Production and, in cooperation with other departments, offers both MS and PhD degrees in the Interdepartmental Curriculum in Nutrition.

Dairy Science Courses

****112.** Feeding Dairy Cattle. (3)

¹In College of Agriculture

****120.** Dairy Cattle Research and Breeding. (5)

***121.** Milk Secretion. (3)

122. Dairy Herd Management and Operations. (3)

215. Seminar. (1)

220. Research in Dairy Industry. (Arr)

254. Special Problems in Dairy Industry. (Arr)

Nutrition and Biochemistry Seminar. (See Animal Husbandry 270)

400. Continuing Graduate Advisement. (3)

^{*}Taught 1970-71

^{**}Taught 1971-72

²*Department of*

Economics

Head: Dwight M. Blood, PhD, University of Michigan

Office: Business 611

Degrees Offered: MS, MA, PhD

The Department of Economics offers work leading to the Master of Science, Master of Arts, and Doctor of Philosophy degrees in Economics.

Candidates for the Master's degree in Economics must take the following or equivalent undergraduate courses: Econ 106, 107, 108, 140, 165; Ap St 131, 132, or BA 131, 132. Citizens of the United States are also required to take Econ 123 or 125 or 126, and 170. All candidates except those specializing in Economics History, Labor Economics, or teaching at the high school level are also required to take Economics 190, 191, and 192.

²In Colleges of Business and Agriculture

The usual candidate is expected to complete a thesis as part of the requirements for the MS or MA degree. In this case, a minimum of 45 credit hours is required. This includes nine to 12 hours of thesis credit, and a minimum of 16 credit hours of graduate Economics courses in the 200 series. The balance of credit hours may be taken from any upper division or graduate courses in Economics or related fields with the approval of the chairman of the Master's program. Courses which must be included are Econ 203, 207, and 208. Successful completion of a comprehensive written examination and oral thesis defense is also re-

quired. Students with undergraduate degrees in Economics or closely related fields should be able to complete thesis requirements in three or four quarters.

For students desiring a non-thesis option, a minimum of 65 credit hours is required. This includes not less than 28 credit hours of graduate Economics courses in the 200 series. (In certain cases approved 200 series courses in related fields may be used to meet these requirements.) The balance of credit hours may be taken from any upper division or graduate courses in Economics or related fields with the approval of the chairman of the Master's program. Courses which must be included are Econ 203, 207, and 208. Successful completion of a written comprehensive examination with emphasis on required graduate courses is also required. Usually this examination will be scheduled during the fifth quarter of work. Students with undergraduate degrees in Economics or closely related fields should be able to complete these requirements in five or six quarters.

Graduate research is promoted through departmental relationship with the University Research Council, the Economics Research Center, and other private and public agencies.

Students who plan to do graduate work in Economics should have or plan to acquire good training in Mathematics, Statistics, and Languages.

Doctor of Philosophy Degree Requirements. The student must meet the requirements for admission to candidacy and pass the Final Thesis Examination.

A student shall be admitted to candidacy upon completion of the following four requirements:

1) Successful performance on the following five preliminary examinations:

a) A written core examination covering Basic Price Theory and Basic Income and Employment Theory.

b) A written core examination in Basic Income and Employment.

c) A written preliminary examination in the area of Quantitative Economics.

d) Two additional written preliminary examinations, at least one of which must be chosen from a list of fields of concentration as offered by the program, not including the field of Quantitative Economics.

2) Demonstration of competence in at least five fields as offered in the program, in addition to the fields covered in the preliminary examinations. Competence may be shown by graduate credit with a grade of "C" or better in a course of at least three credit hours.

3) Demonstration of reading knowledge of one foreign language.

4) Approval of a thesis prospectus by the interdepartmental faculty.

After being admitted to candidacy, the student will prepare a thesis and will be examined on the thesis by the entire interdepartmental faculty.

Agricultural Economics. There are excellent facilities in the Department of Economics for graduate study in several divisions of Agricultural Economics, such as: Agricultural Business Management, Farm Management, Resource Economics, Agricultural Finance, and Agricultural Marketing. Research in these areas is conducted by members of the staff and federal collaborators, with the assistance of graduate students.

Economics Courses

106. History of Economic Thought. (3)
107. Microeconomic Theory. (4)
108. Income and Employment Theory. (4)
123. Introduction to Labor. (3)
125. Trade Unionism and Collective Bargaining. (3)
126. Trade-Unionism and the Law. (3)
127. Social Security. (3)
128. Manpower Economics. (3)
140. International Economic Relations. (5)
150. Communist Economics. (3)
155. Public Finance and Fiscal Policies. (3)
156. Special Problems in State and Local Finance. (2)
165. Money and Banking. (5)
170. Economic History of the United States. (5)
171. Economic and Business Fluctuations. (5)
174. Business and Government. (3)
175. Economic History of Far West. (3)
180. Economic Development. (3)
190. Quantitative Economics I. (3)
191. Quantitative Economics II. (3)
192. Quantitative Economics III. (3)
200. Thesis. (Arr)
201. Readings and Conferences. (Arr)
202. Independent Research. (Arr)
203. Seminar in Economic Research. (3)
204. Modern Economic Thought. (3)
207. Price Theory. (3)
208. Advanced Income Theory. (3)
211. Literature of Economics. (2)
225. Labor Economics Seminar. (3)
240. Seminar in International Trade. (3)
255. Seminar in Public Finance. (3)
265. Advanced Money and Banking. (3)
270. Economic History Seminar. (3)
290. Introduction to Econometrics. (3)

291. Theory of Econometrics. (3)
292. Advanced Theory of Econometrics. (3)
307. Price Theory. (3)
308. Income Theory. (3)
400. Continuing Graduate Advisement. (3)

Agricultural Economics Courses

102. Intermediate Farm Management. (3)
106. Land Economics. (3)
112. Agricultural Cooperatives. (3)
116. Livestock Economics. (3)
- 121, 122. Agricultural Statistics and Research Techniques. (4, 4)
131. Agricultural Credit. (3)
145. Agricultural Businesses. (4)
150. Special Readings. (Arr)
155. Law on the Farm. (3)
163. Intermediate Agricultural Marketing. (3)
170. Farm and Ranch Appraisal. (3)
172. Advanced Farm and Ranch Management. (3)
180. Government and Agriculture. (3)
186. Land Problems and Appraisal. (3)
190. International Agricultural Development. (3)
200. Advanced Production Economics I. (5)
214. Thesis. (Arr)
220. Agricultural Production Economics II. (3)
- 235, 236, 237. Student and Faculty Seminar.
240. Research Methodology. (2)
241. Research Methodology. (2)
250. Special Problems. (Arr)
257. Resource Economics. (3)
263. Advanced Marketing. (5)
265. Agricultural Price Analysis. (3)
280. Agricultural Policies. (5)
400. Continuing Graduate Advisement. (3)

¹*Department of*

Educational Administration

Head: Charles O. Ryan, EdD, University of Arizona

Office: Education 310

Degrees offered: MEd, MS, EdD

The Department of Educational Administration provides programs leading to the graduate degrees of Master of Education, Master of Science, Specialist in Educational Administration (six-year program) and Doctor of Education. All programs have been fully accredited by the National Council of Accreditation of Teacher Education. This in turn means that the recipient of the Specialist in Educational Administration or the Doctor of Education has met the graduate requirements for membership in the American Association of School Administrators.

Programs offered by the department will satisfy the certification requirements outlined by the Utah State Board of Education. Candidates may seek either a basic professional or a professional certificate for positions as an elementary principal, secondary principal, and superintendent. To receive a basic professional endorsement requires a Master's degree or 55 credit hours in an approved program in school administration. The professional endorsement requires a planned two-year graduate program in Educational Administration. Other specific requirements are outlined in the regulations of the State Board of Education. Details of these programs are available from the department.

Educational Administration Courses

- 154. History of Education. (3)
- 207. Elementary School Administration. (3)
- 236. Secondary School Administration. (3)
- 254. Organization and Administration of Education. (3)
- 260. Historical and Philosophical Foundations of Education. (3)
- 261. Organization and Administration of Special Education. (3)
- 262. Organization and Administration of Guidance. (3)
- 265. Computer Application and Systems Design in Education. (3)
- 266. Introduction to Research in Education. (3)
- 267. Research in Psychology and Education. (3)
- 269. Comparative Education. (3)
- 270. Public Relations in Education. (3)
- 274. Legal Aspects of School Administration. (2)
- 276. Field Experience in School Administration. (Arr)
- 283. Reading and Conference. (Arr)
- 285. Research and Thesis Writing. (Arr)
- 350. Seminar in Administrative Theory and Research. (3)
- 351. Seminar in Communications Theory and Research. (3)
- 352. Seminar in Problems of Educational Administration. (3)
- 355. School Building Programs. (3)
- 360. Philosophy of Education, Advanced. (3)
- 361. Readings in Foundations of Education. (3)

¹In College of Education

58 *Electrical Engineering*

- 362. Group Processes in Educational Leadership. (3)
- 367. Administration of School Personnel. (3)
- 368. Higher Education. (3)
- 369. The Junior College. (3)
- 374. Practicum in Public School Surveys. (Arr)
- 375. Seminar in School Law. (3)
- 381. School Finance. (3)
- 382. School Business Management. (3)
- 384. Internship in School Administration. (Arr)
- 385. Field Studies and Thesis. (Arr)
- 400. Continuing Graduate Advisement. (3)

¹Department of

Electrical Engineering

Head: Bruce O. Watkins, PhD, University of Minnesota; registered professional engineer

Office: Engineering L-148

Degrees offered: MS, PhD

The graduate program in Electrical Engineering offers course work leading to the MS and PhD degrees. Supporting course work in Physics, Mathematics, and other engineering departments augment the Electrical Engineering courses to provide a broad and thorough advanced study program.

Extensive research programs in the Electro-Dynamics Laboratories and the Antenna and Propagation Laboratory provide a wide range of research opportunities for graduate students. Research in the areas of semiconductor devices and circuitry and automatic control systems provide further areas of graduate specialization.

In order to be admitted into the Electrical Engineering graduate program, the applicant must take the advanced GRE test in either Mathematics, Engineering, or Physics, in addition to the aptitude part required of all graduate students. A student may be admitted on probation without the advanced test, but it must then be taken during the first quarter of residence.

The MS degree may be obtained in four quarters, providing the graduate student has had training equivalent to that required for the BS degree in Electrical Engineering at USU. If his training is inadequate, additional undergraduate course work, not credited toward the MS, may be necessary. Either a thesis (nine credits) or a Plan B design or research paper (three credits) is necessary for the MS degree. Graduate EE Seminar is required for three quarters, but these credits (three) will not apply to the total credit hours (45) specified by the Graduate School.

Electrical Engineering Courses

- 120. Antennas. (4)
- 129. Electroacoustics. (4)
- 141. Microwaves. (4)
- 160. Feedback Control. (4)
- 165. Analog Computers. (3)
- 171, 172. Engineering Systems. (3, 3)
- 178. Switching Circuits. (3)
- 180, 181, 182. Analysis and Design of Electronic Circuits. (4, 4, 4)

¹In College of Engineering

185. Introduction to Semiconductor Device Theory. (3)
- 202, 203. Advanced Semiconductor Theory. (3, 3)
- 204, 205. Magnetic Materials and Quantum Electronics. (3, 3)
208. Advanced Energy Conversion. (3)
209. Power Systems. (3)
- 210, 211. Amplifier Circuit Theory. (4, 4)
212. High-speed Switching Devices and Circuits. (4)
- 215, 216, 217. Theory of Linear Systems. (3, 3, 3)
- 222, 223, 224. Network Analysis and Synthesis. (3, 3, 3)
- 231, 232, 233. Electromagnetic Fields and Waves. (3, 3, 3)
- 235, 236, 237. Radio Wave Propagation. (3, 3, 3)
238. Selected Readings in Radio Science. (2)
239. Selected Readings in Radio Science. (2)
240. Microwave Measurements. (2)
- 242, 243, 244. Applied Plasma Dynamics. (3, 3, 3)
245. Transistors and Integrated Circuits. (3)
- 251, 252, 253. Feedback Control Systems. (3, 3, 3)
261. Space Science and Engineering. (3)
273. Special Problems in Electrical Engineering. (Arr)
- 275, 276, 277. Graduate EE Seminar. (1, 1, 1)
278. Seminar in Radio Science. (1)
- 282, 283, 284. Electro-optics. (3, 3, 3)
- 291, 292. Statistical Communication. (3, 3)
293. Detection, Estimation, Modulation Theory. (3)
294. Information Theory and Coding. (3)
295. Advanced Topics in Communications Theory. (3)
298. Graduate Thesis. (Arr)
400. Continuing Registration. (3)

¹Department of

Elementary Education

Head: Kenneth C. Farrer, EdD, University of Utah

Office: Education 206

Degrees offered: MA, MEd, MS, EdD (Curriculum Development and Supervision)

Masters' Degrees. The department offers programs leading to the degrees of Master of Arts, Master of Education, and Master of Science in teaching, or supervision and curriculum development. Those desiring to meet graduation requirements in these areas at the Master's degree level should matriculate in the Department of Elementary Education.

Doctor of Education Degree. This department cooperates with other departments in offering the Doctor of Education degree in Cur-

riculum Development and Supervision with specialization in Elementary Education. The degree is designed for those preparing for Elementary Education curriculum coordinators or supervisors, and college teachers. For additional information, write to the head of the department or the Chairman of Doctor of Education Committee in Curriculum Development and Supervision in the College of Education.

Education Courses

204. Elementary School Curriculum, Advanced Course. (3)

¹In College of Education

205. Improvement of Kindergarten Education. (3)
207. Elementary School Administration. (3)
213. Diagnosis of Reading. (3)
214. Remedial Reading Instruction. (3)
216. Practicum in Remedial Reading. (3)
219. Seminar in Elementary Education. (3)
220. Creative Education in the Elementary School. (3)
225. Improvement of Reading in the Elementary School. (3)
226. Improvement of Science in the Elementary School. (3)
227. Improvement of Arithmetic and Mathematics in the Elementary School. (3)
228. Improvement of Social Studies in the Elementary School. (3)
229. Improvement of Language Arts in the Elementary School. (3)
259. Supervising Student Teaching. (3)
264. Instructional Leadership in Education. (3)
266. Introduction to Research in Education. (3)
267. Research in Psychology and Education. (3)
283. Reading and Conference. (Arr)
285. Research and Thesis Writing. (Arr)
364. Theories of Teaching. (3)
365. Curriculum Development. (3)
366. Internship in School Supervision. (Arr)
385. Field Studies and Thesis. (Arr)
400. Continuing Graduate Advisement. (3)

¹Department of

English and Journalism

Head: T. Y. Booth, PhD, Stanford University

Office: Library 420

Degree offered: MA

Master of Arts Degree. The Department of English and Journalism offers programs leading to the MA degree in English and in American Studies. In each of these fields, two programs are available. The first consists of 45 credit hours (of which at least 20 credit hours, exclusive of thesis, must be in courses in the 200 series, these to include at least three seminars), including a thesis for which either nine or ten credit hours are given. The second program also consists of 45 credit hours, but instead of a thesis the candidate must complete at least 30 credit hours of work in the courses numbered above 200, these to include at least

four seminars. All candidates take a final oral examination of approximately two hours' duration covering the material of their undergraduate and graduate programs. The focus will be on the thesis for those who have written one.

Only grades of "B" or better will be accepted for credit toward the Master's degree. A "P" (passing) may be given in courses over 200 but must represent "B" or better.

Although it is anticipated that a candidate will be given some choice in determining his academic program, the department retains its right to require that individual candidates follow one or the other of these programs, in pursuit of

¹In College of Humanities and Arts

what the department believes to be the student's interest.

At his earliest opportunity the prospective graduate student should consult with the chairman of the departmental graduate committee, Dr. Del Rae Christiansen, L426.

On the basis of the results of the Graduate Record Examination, the candidate may 1) be denied admission to candidacy or 2) be required to do extra course work.

The candidate must take a department-administered preliminary examination in the field of English or American Studies during his first quarter in residence. Candidates who fail to pass must: 1) wait for six months before taking the examination a second time, and 2) complete satisfactorily additional course work up to 10 credit hours as designated by the departmental graduate committee.

As soon as possible after these tests, candidates will be placed in one of the two programs leading to the degree. The candidate will meet with the chairman of the departmental graduate committee to decide upon a major professor and a committee.

The candidate must complete the course work outlined by his major professor.

All candidates will be required to take English 201. All English majors will be required also to take English 209; American Studies majors will take at least one of the following: English 162, 205, 209, 261.

At least one month before the final oral examination, the candidate must stand for examination (written or oral, at the discretion of his major professor and his committee) on at least 15 titles chosen by the candidate from a list chosen by the department. At

least one title and no more than four will be chosen from each of the five categories. A record of the results of this examination must be filed with the chairman of the departmental graduate committee.

Should the candidate be placed in the thesis program, he must present an acceptable thesis which shows adequate research and writing ability on his part. For this he will receive nine or ten credit hours.

The candidate must pass a final oral examination conducted by his committee under the auspices of the School of Graduate Studies, in the thesis and the field of the thesis. The candidate will also be expected to display a general acquaintance with major authors, types, and periods in English, American, and World Literatures.

Should the candidate be placed in the alternative program, he will present added course work in the 200 series and prepare for a comprehensive oral examination to be taken in the last quarter of his period in residence.

At least two of the seminar papers must be brought up to thesis standards, in accordance with the *MLA Style Sheet*, and filed with the School of Graduate Studies.

The head of the department will designate the members of the examining committee.

Candidates failing in this examination may be required by the departmental graduate committee to complete satisfactorily additional course work before submitting themselves for re-examination.

Before the candidate schedules his final oral he must obtain a clearance statement from the chairman of the departmental graduate committee signifying that all requirements have been fulfilled.

MA Degree in American Studies. Candidates for the Master's degree in American Studies are required to present a Bachelor's degree with American Studies, English, History, or Political Science as a major. The course of study will be arranged in consultation with a member of the American Studies Committee and is subject to approval by the chairman of the committee. The emphasis in graduate work will be largely governed by a) the student's cultural and professional objectives and b) his undergraduate course work.

Total credit and examination requirements are in general the same as those for the Master's degree in English. However, the departmental qualifying examination will be administered by the American Studies Committee and will cover primarily American Literature, American History and American Political Institutions.

A selection of the following courses may be applied toward satisfying requirements for the Master's degree in American Studies: Engl 142, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 201, 251, 252, and 253; History 142, 143, 144, 145, 146, 147, 155, 171, 204, and 224; Poli Sci 101, 117, 118, 119, 125, 127, 140, 180, 181, 182, 201, 207, 208, and 209.

As many as 10 credits may also be drawn from upper division courses in the following subject matter fields: English and Comparative Literature, English and World History, Philosophy, Art, Music, Sociology, and Economics. All students must take at least one of the following: Engl 162, 205, 209, 261.

In American Studies (as in the regular English program) the student may elect an alternate plan which requires a minimum of 45

credit hours of which at least 30 must be in courses numbered above 200.

English Courses

102. Introduction to Language. (3)
104. Grammar. (3)
105. Studies in Linguistics. (3)
117. Creative Writing. (a) Short Stories (3),
(b) Essays (3), (c) Poetry (3)
132. 20th-Century Poetry. (3)
134. Literary Criticism. (4)
137. English Novel, 18th-Century. (3)
138. English Novel, 19th-Century. (3)
139. 20th-Century Novel. (3)
140. Greek Literature. (5)
141. Roman Literature. (3)
142. The Bible as Literature. (3)
147. Comparative Literature. (3)
148. Comparative Literature. (3)
149. Comparative Literature. (3)
150. American Poetry. (3)
151. American Fiction. (3)
152. American Drama. (3)
153. Western American Literature. (3)
154. Readings in Individual American Authors. (2)
155. The Colonial Period in American Literature. (3)
156. The Age of Reason in American Literature. (3)
157. The American Literary Renaissance. (3)
158. Realism and Modernism in American Literature. (3)
159. Critical Studies of Individual American Authors. (2)
162. Chaucer. (5)
163. Shakespeare. (5)
164. Shakespeare. (5)
165. Readings in Individual English Authors. (2)
166. Medieval English Literature. (5)

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| 167. Critical Studies of Individual English Authors. (2) | 205. History of the English Language. (3) |
| 168. English and European Drama, Medieval to 19th Century. (5) | 209. Anglo-Saxon. (5) |
| 169. Modern Drama. (5) | 234. Seminar in Modern Criticism. (3) |
| 170. Milton. (3) | 251. Seminar: Early American Literature. (3) |
| 171. The English Renaissance. (5) | 252. Seminar: 19th-Century American Literature. (3) |
| 175. 17th-Century Literature. (5) | 253. Seminar: 20th-Century American Literature. (3) |
| 180. 18th-Century Literature. (5) | 261. Reading of Middle English. (3) |
| 190. The Romantic Period. (5) | 265. Seminar in English Authors. (3) |
| 191. The Victorian Period. (5) | 271. Seminar in the English Renaissance. (3) |
| 192. 20th-Century British Literature. (5) | 275. Seminar in 17th-Century Literature. (3) |
| 200. Thesis. (Arr) | 280. Seminar in 18th-Century Literature. (3) |
| 201. Bibliography and Methods. (Required) | 290. Seminar in Late English Literature. (3) |
| 202. a, b, c. Problems in Teaching Freshman English. (1, 1, 1) | 299. Independent Study. (1-5) |
| | 400. Continuing Graduate Advisement. (3) |

¹Department of

Family and Child Development

Head: Don C. Carter, EdD, Columbia University

Office: Family Life 215

Degree offered: MS

The Department of Family Living and Child Development offers work leading to the Master of Science degree. Two separate majors are available for graduate study: 1) Child Development, and 2) Marriage and Family Relations.

Majors in Child Development specialize in Preschool Education, with related work available in other departments such as Psychology, Education, and Sociology. If you select this major, you will have an opportunity to work in an internship program leading to occupational placement in college teaching, nursery school teaching or admin-

istration, and activity programs for hospitalized children.

Majors in Marriage and Family Relations will study in a program intended to provide preparation for teaching, either at the college or high school level, for extension service work in family life education, or for further study toward a higher degree in Marriage Counseling or Marriage and Family Life Education.

Family and Child Development Courses

115. Growth of the Infant. (3)
140. The Family in its Social Setting. (3)

¹In College of Family Life

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- 164. Nursery School Planning and Administration. (3)
- 174. Nursery School Methods. (3)
- 175. Practice Teaching in the Nursery School. (6)
- 181. Sex Education. (3)
- 185. The Family in the Middle and Later Years. (3)
- 205. Child Psychology and Guidance. (3)
- 208. Seminar in Child Guidance. (3)
- 251. Seminar in Family Relations. (3)
- 252. Seminar in Child Development. (3)
- 253. Current Research in Child Development. (3)
- 254. Current Research in the Family. (3)
- 267. Deprivation in Early Childhood. (3)
- 275. Internship in Nursery Education. (6)
- 278. Practicum in Agencies Serving Children. (12)
- 280. Marriage Counseling. (3)
- 281. Marriage Counseling Practicum. (Arr)
- 287. Family Theory and Frameworks. (3)
- 290. Independent Study. (Arr)
- 293. Research Methods. (3)
- 295. Research for Master's Thesis. (Arr)
- 400. Continuing Graduate Advisement. (3)

¹Department of

Food and Nutrition

Head: Ethelwyn B. Wilcox, PhD, Iowa State University

Office: Family Life 111

Degrees offered: MS, PhD (Interdepartmental Curriculum in Nutrition)

The demand for qualified people with advanced degrees in Nutrition and Food Science far exceeds the supply. The man or woman who chooses one of these programs will have many fine opportunities for positions in university research and teaching; in state, federal, or private research laboratories; in extension work as a specialist; and in food industries. Departmental course work is built on the root disciplines of Mathematics and Statistics, Chemistry, Physics, Physiology, and Microbiology.

Through interdepartmental curricula, MS and PhD degrees are available in Nutrition and a PhD degree is offered in Food Science and Technology. In addition, the MS degree is offered in Food and Nutrition and in Food Science.

Detailed requirements may be obtained upon request from the department head.

Food and Nutrition Courses

- 107. Science in Relation to Food Preparation. (3)
- 108. Science in Relation to Food Preparation. (3)
- 109. Experimental Foods. (3)
- 143. Advanced Nutrition. (5)
- 145. Diet Therapy. (5)
- 146. Food Processing in Relation to Consumer Use. (2)
- 147. Food Economics. (2)
- 180. Quantity Food Preparation. (5)
- 182. Institutional Organization, Management and Cost Control. (4)
- 183. Institutional Equipment Selection, Maintenance, and Layout. (3)

¹In College of Family Life

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| 200. Laboratory Methods in Nutrition Research. (3) | 232. Human Nutrition. (3) |
| 201. Laboratory Methods in Nutrition. (2) | 233. Readings in Foods. (3) |
| 203. Nutrition Research: Micro-Chemical Analysis. (3) | 243. Nutrition and Growth. (3) |
| 207. Laboratory Methods in Foods Research. (Arr) | 275. Problems in Institutional Administration. (Arr) |
| 230. Human Nutrition. (3) | 290. Independent Study. (Arr) |
| 231. Human Nutrition. (3) | 291. Graduate Seminar. (1) |
| | 295. Research and Thesis. (Arr) |
| | 400. Continuing Graduate Advisement. (3) |

¹*Department of*

Food Science and Industries

Head: C. A. Ernstrom, PhD, University of Wisconsin

Office: Animal Industry 212

Degrees offered: MS, PhD (Food Science and Technology)

The Department of Food Science and Industries offers the MS degree and participates in an Inter-departmental PhD program in Food Science and Technology.

Candidates for the MS degree must comply with the requirements of the School of Graduate Studies and with additional departmental requirements. Copies of departmental requirements will be made available to interested students who request them. Student planning to enter the graduate program in Food Science and Industries should have a Bachelor's degree in a field of Biological, Physical, Agricultural, Nutritional, or Engineering Science.

¹In College of Agriculture

Food Science and Industries Courses

- 100. Food Analysis. (5)
- 101. Ice Cream and Concentrated Milks. (5)
- 103. Cheese. (5)
- 105. Management and Operation of Dairy Plants. (5)
- 106. Sensory Evaluation of Foods. (4)
- 115. World Food: Demand and Supply. (2)
- 130. Food Chemistry. (5)
- 135. Food Processing Mechanics. (5)
- 140. Processing and Storage of Fruits and Vegetables. (5)
- 150. Meat Processing. (4)
- 180. Seminar. (1)
- 200. Research and Thesis. (Arr)
- 210. Special Problems. (Arr)
- 220. Graduate Seminar. (1)
- *241. Food Toxicology. (4)

*Taught 1970-71

¹Department of

Forest Science

Head: Lawrence S. Davis, PhD, University of California at Berkeley

Office: Forestry-Zoology 155

Degrees offered: MS, PhD

The Department of Forest Science offers the Master of Science, Master of Forestry, and Doctor of Philosophy degrees. The MS is granted to students possessing a prior degree in Forestry in the following eight subject areas: Forest Management, Silviculture, Forest Ecology, Forest Recreation, Forest Watershed Management, Forest Economics, Forest Protection, and Wood Utilization. Students with or without a prior forestry degree may earn the MS degree in the following subject areas: Outdoor Recreation and Watershed Science.

The MS degree in the Forest Science Department may be earned by a student with acceptable scholarship, upon completion of a prescribed course of study and fulfillment of other requirements listed by the School of Graduate Studies.

The MF degree program is available to students with acceptable scholarship in a non-Forestry undergraduate degree who wish to obtain a professional Forestry degree at the graduate level. The minimum requirements include the completion of 45 credit hours in the basic sciences of Chemistry, Physics, Mathematics, Botany, and Soils; 52 credit hours in specified Forestry courses; and 10 credit hours of graduate (200 series) course work. Part of these requirements may have been satisfied during the student's undergraduate course work.

A program of instruction and research leading to the PhD degree is offered to a selected number of students in Forest Science, Outdoor Recreation, and Watershed Science programs.

The Watershed Science Unit, an interdepartmental organization between the Forest Science Department and Range Science Department, offers both Master and Doctoral degrees in Watershed Science. Graduates of these programs are qualified hydrologists.

Before a student's application can be considered for admission to the graduate program in the Forest Science Department it will be necessary for the applicant to present the results of his Graduate Record Examination. Prospective applicants to the department should arrange to take the examination during their last year of undergraduate work, or arrange to take the examination far enough in advance so the results will be available when their application is being considered.

Forest Science Courses

- 103. Silviculture and Dendrology. (5)
- 106. Forest Measurements I. (4)
- 107. Forest Measurements II. (3)
- 110. Principles of Conservation. (3)
- 112. Dendrology I. Hardwoods. (3)
- 113. Dendrology II. Conifers. (2)
- 114. Silviculture I. (3)
- 115. Silviculture II. (3)

¹In College of Natural Resources

- 116. Seeding and Planting. (2)
- 118. Forest Protection I. (3)
- 119. Forest Protection II. (3)
- 120. Silviculture III. (3)
- 121. Forest Management. (4)
- 122. Forest Valuation. (4)
- 123. Forest Economics. (5)
- 125. Logging. (3)
- 126. Wood Technology. (3)
- 130. Milling and Products. (3)
- 132. Forest Administration and Policy. (3)
- 133. Population and Resource Perspectives.
- 134. Aerial Photo Interpretation. (3)
- 135. Recreation Facility Management. (3)
- 137. Recreational Use of Wildland. (3)
- 138. Regional Recreation Planning. (2)
- 139. Interpretive Planning. (3)
- 140. Forest Recreation Management. (3)
- 145. Forest Problems. (1-3)
- 146. Junior Field Problems. (1)
- 150. Honors Problems.
- 201. Forest Management Seminar. (1)
- 203. Forest Recreation Seminar. (1)
- 204. Forest Ecology. (3)
- 205. Silviculture. (3)
- 206. Forest Management. (2)
- 207. Forest Protection. (2)
- 209. Forest Economics. (2)
- 210. Forest Recreation. (2)
- 211. Thesis. (10-15)
- 212. Forest Utilization. (2)
- 213. Forest Ecology Problems. (2)
- 215. Tree Improvement and Forest Genetics. (3)
- 220. Advanced Forest Autecology. (3)
- 221. Advanced Forest Synecology. (3)
- 222. Forest Ecosystem Analysis. (3)
- 232. Natural Resources Administration and Policy.
- 400. Continuing Graduate Advisement. (3)

Watershed Science Courses

- 180. Watershed Management. (4)
- 190. Watershed Instrumentation. (3)
- 191. Forest and Range Hydrology. (4)
- 202. Watershed Science Seminar. (1)
- 208. Watershed Science Problems. (1-3)
- 240. Watershed Science Thesis. (1-15)
- 275. Snowpack Management. (2)
- 280. Watershed Analysis. (3)
- 400. Continuing Graduate Advisement.

¹Department of

Geology

Head: Clyde T. Hardy, PhD, Ohio State University

Office: Main 258

Degree offered: MS

Master of Science Degree. The Department of Geology offers advanced study and research leading to the MS degree.

¹In College of Science

Geology Courses

- 101. Mineralogy. (5)
- 102. Optical Mineralogy and Petrography. (3)
- 103. Engineering Geology. (3)
- 104. Introductory Geochemistry. (3)

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| 105. Sedimentary Geochemistry. (3) | 133. Exploration Geophysics. (3) |
| 106. Invertebrate Paleontology. (5) | 134. Geomorphology. (3) |
| 107. Minerals and Rocks. (3) | 135. Marine Geology. (3) |
| 108. Stratigraphy and Sedimentation. (5) | 200. Sedimentary Petrography. (3) |
| 109. Sedimentary Petrology. (3) | 201. Sedimentary Petrography. (3) |
| 110. Structural Geology. (5) | 205. Marine Geochemistry. (3) |
| 111. Petroleum Geology. (3) | 210. Graduate Seminar. (1-6) |
| 113. Economic Geology. (5) | 212. Paleocology and Biostratigraphy. (3) |
| 114. Geologic Field Methods. (3) | 213. Paleozoic Stratigraphy. (3) |
| 115. Surficial Geology. (5) | 214. Mesozoic and Cenozoic Stratigraphy. (3) |
| 116. Special Problems. (1-6) | 215. Regional Tectonics. (3) |
| 117. Ground-Water Geology. (4) | 216. Igneous and Metamorphic Petrography. (3) |
| 118. Geologic Field Course. (8) | 217. Igneous and Metamorphic Petrology. (3) |
| 130. Photogeology. (4) | 219. Invertebrate Paleontology. (3) |
| 131. X-ray Mineralogy. (4) | 220. Thesis. (Arr) |
| 132. Clay Mineralogy. (4) | 400. Continuing Graduate Advisement. (3) |

¹Department of

Health, Physical Education and Recreation

Head: H. B. Hunsaker, MS, University of Oregon; doctoral work, University of California, University of Washington, and University of Utah

Office: Smart Gym 306

Degrees offered: MS, EdD (Curriculum Development and Supervision)

Master of Science Degree. The department offers courses leading to the MS degree in Health Education, Physical Education, or Recreation. Before admission to candidacy for the degree, a student must complete the equivalent of a Bachelor's degree in Physical Education at USU and additional requirements as prescribed by the School of Graduate Studies. Required courses are: PE 206, 292,

294, 271, 295, 299; Engl 111 or 211; Psych 112.

Physical Education Courses

- 177. Physical Education in the Elementary School. (3)
- 182. Materials and Methods in Elementary Physical Education. (3)
- 206. Analysis of Sports Performance. (3)
- 207. Problems of Athletics. (3)
- 246. Efficiency in Human Movement. (3)
- 250. Reading and Conference. (Arr)

¹In College of Education

- 271. Research and Thesis Writing. (Arr)
- 275. Philosophy of Physical Education. (3)
- 282. Curriculum in Physical Education. (3)
- 290. Problems in the Development of Physical Fitness. (3)
- 294. Research and Evaluation in Physical Education. (3)
- 295. Problems in Physical Education. (3)
- 299. Physical Education Seminar. (Arr)
- 400. Continuing Graduate Advisement. (3)

Psychology Courses

- 250. Psychological Aspects of Sports Performance. (2)

Recreation Education Courses

- 170. Organization of Playgrounds and Community Centers. (3)

- 172. Planning Recreation Areas and Facilities. (3)
- 173. Philosophy of Recreation. (3)
- 196. Organization of Community Recreation. (3)
- 293. Recreation Leadership. (3)
- 400. Continuing Graduate Advisement. (3)

Health Education Courses

- 217. Health Education Workshop. (2)
- 145. Alcohol and Tobacco Education. (3)
- 151. Public and School Health Administration. (3)
- 158. Curriculum Organization in Health. (3)
- 163. Methods and Materials in Health Education. (3)

¹Department of

History

Head: William F. Lye, PhD, University of California at Los Angeles

Office: Main 317

Degrees offered: MA, MS

The University offers both the MA and the MS degrees in History. Either degree may be obtained under the following two plans. Plan A is recommended for all students who intend to continue graduate work beyond the Master's degree. Students under this plan are urged to meet the language requirements necessary for the MA degree. An acceptable thesis must be submitted for which a maximum of nine credit hours will be given. The student is required to defend his thesis and historical knowledge in an oral examination before his committee. It is recommended that 15

credit hours or more be taken in courses in the 200 series. Plan B is recommended for all students pursuing a career of teaching history in the secondary schools. Under this plan, two seminar reports, approved by his committee, and additional concentration in seminar work substitute for the Master's thesis. Five seminars and colloquia are required, including History 201 or its equivalent. Plan B students must successfully complete a comprehensive written examination in certain fields of specialization agreed upon by the student and his supervisory committee.

¹In College of Social Sciences

The department cooperates with the Department of English in administering the graduate program leading to the Master's degree in American Studies. See the bulletin section on English for a statement of that program.

The Institute of Utah Studies.

By virtue of its Library holdings, its faculty, and its research programs, USU is a leading center for the study of all phases of Utah's historic and contemporary development. The Institute of Utah Studies has been established for the purpose of collecting and preserving the written and oral record of Utah's distant and recent past, of training persons in the use of the sources and literature of Utah history, and encouraging and assisting all persons, especially teachers and research writers in the Social Sciences and Humanities, in the detailed study of any and all phases of Utah's development, and of offering courses and seminars in regular history. The institute appeals especially to teachers of historical and analytical studies of a regional nature. Director of the Institute of Utah Studies is S. George Ellsworth.

History Courses

History of Europe

- 105. Greek History. (5)
- 106. Roman History. (5)
- 107. The Rise of Christianity. (5)
- 111. Medieval Europe. (3)
- 114. History of Science I. (3)
- 115. History of Science II. (3)
- 121. Germany Since the Reformation. (5)
- 124. Renaissance and Reformation. (5)
- 125. Absolute Monarchies. (3)
- 126. French Revolution and Napoleon. (3)

- 127. Nineteenth Century Europe. (3)
- 128. Twentieth Century World. (3)
- 138. History of Russia to 1917. (3)
- 139. History of the Soviet Union. (3)
- 161. England to 1603. (3)
- 162. England Since 1603. (3)
- 163. The British Empire. (3)
- 165. Expansion of Europe. (5)
- 166. European Cultural History I. (3)
- 167. European Cultural History II. (3)
- 168. European Cultural History III. (3)
- 170. A Study of War and Peace in History. (3)

History of the United States

- 135. The Frontier in American History. (3)
- 137. History of Utah. (5)
- 141. Colonial America. (3)
- 142. The New Nation. (3)
- 143. The Jacksonian Era. (2)
- 144. The Civil War and Reconstruction. (3)
- 145. Development of Modern America. (3)
- 146. The Progressive Era. (3)
- 147. Recent America. (3)
- 150. Comparative American Religions. (3)
- 155. Cultural History of the United States. (5)
- 171. Constitutional History of the United States. (5)
- 173. Immigrants in America. (3)
- 174. History of Black America. (3)

History of Africa and Asia

- 151. History of Africa I. (3)
- 152. History of Africa II. (3)
- 153. History of Southern Africa. (3)
- 175. East Asia to 1800. (3)
- 176. East Asia Since 1800. (5)
- 177. Chinese Civilization. (3)
- 178. Japanese Civilization. (3)
- 179. History and Civilization of India. (3)

History of Latin America and Canada

- 169. History of Canada. (3)
- 181. Latin America to 1830. (3)
- 182. Latin America Since 1830. (3)
- 183. Contemporary Latin America. (3)
- 184. History of Mexico. (3)
- 185. History of the United States - Latin American Relations. (3)
- 186. Economic History of Latin America. (3)

Senior Professional Courses

- 190. Sources and Literature of History. (3)
- 192. Historical Synthesis. (2)
- 193. Introduction to Historical Research. (3)

Graduate Seminars and Colloquia

- 201. Historical Method. (3)
- 203. Historiography. (3)

- 205. Philosophy of History. (3)
- 207. Seminar in American Colonial History. (3)
- 222. Seminar in European History. (3)
- 223. Colloquium in European History. (3)
- 224. Seminar in American History. (3)
- 225. Colloquium in American History. (3)
- 226. Seminar in Western American History. (3)
- 228. Seminar in Latin American History. (3)
- 229. Colloquium in Latin American History. (3)
- 230. Seminar in African History. (3)
- 231. Colloquium in African History. (3)
- 237. Teaching Utah History. (3)
- 239. Readings and Conferences in Special Areas. (Arr)
- 259. The Teaching of History. (Arr)
- 271. Colloquium on War and Peace. (3)
- 298. Thesis. (Arr)

¹Department of

Home Economics Education

Acting Head: Gwen B. Biddulph, MS, Utah State University

Office: Family Life 318

Degree offered: MS

The department offers three programs for the Master of Science degree:

Plan I. This program is designed especially for those who wish to supervise the student teaching experience or take other home economics supervisory positions. The basic plan requires 45 credit hours. Research and thesis or Plan B reports may be conducted during the school year in on-going classroom situations. Evidence of a minimum of two years of success-

ful teaching on the secondary level must be presented before the degree is granted.

Plan II. This program is designed for either the recent graduate in Home Economics or for the experienced teacher. Emphasis is given to acquiring some depth in subject matter, curriculum development, and instructional techniques.

Plan III. This program is flexible to meet individual needs and is particularly applicable for extension home economists who need community development emphasis

¹In College of Family Life

as well as subject matter strength. The basic program requires 45 credit hours. Included is research and thesis or Plan B reports.

Professional Certificate. The department will supervise a 55-credit hour planned program which requires a minimum of 12 credit hours in Professional Education (which may include Education Psychology), and 12 credit hours in subject matter. This program culminates in a professional certificate. The professional certificate requires evidence of no less than three years of successful teaching experience, and is issued on recommendation of the department to the state certification agency.

The graduate program may be associated with the College of

Family Life Institute for Research on Man and His Personal Environment, which provides opportunities for study of man as a totality with respect to his physical, social, and psychological responses to his environment.

Home Economics Education Courses

- 217. Current Developments in Home Economics Education. (3)
- 237. Seminar. (Arr)
- 290. Independent Study. (Arr)
- 293. Research Methods. (3)
- 295. Research for Master's Thesis. (Arr)
- 400. Continuing Graduate Advisement. (3)

¹Department of

Household Economics and Management

Head: Edith Nyman, MS, Utah State University; graduate work, Michigan State University

Office: Family Life 314

Degree offered: MS

In ever-increasing numbers, mature, "interrupted career" women who hold a Bachelor's degree are turning to the college in pursuit of an advanced degree. Career opportunities are endless. The demand for research workers and educators in the universities, government, and private agencies, business, and industry far exceeds the supply of competent personnel available.

The Department of Household Economics and Management offers

work leading to the Master of Science degree. Flexibility in program planning provides opportunity for developing individual abilities and interests. Course work is arranged in cooperation with other departments of the University including: Economics, Sociology, Psychology, Philosophy, Business Administration, Physics, Anthropology, Family Relations, Food and Nutrition, and Clothing and Textiles.

A graduate assistantship is available as resident adviser at the Home Management House.

¹In College of Family Life

Household Economics and Management Courses

100. Household Equipment. (3)

110. Advanced Equipment. (3)

149. Home Management. (3)

150. Home Management House. (4)

151. Home Management Problems. (4)

152. Management Problems in Home-Community Relations. (3)

155. Family Finance. (3)

160. Seminar. (2)

165. Advanced Housing. (3)

175. Consumer Education. (3)

190. Independent Study. (Arr)

197. Honors Studies. (Arr)

198. Honors Seminar. (2)

249. History and Philosophy of Home Management. (3)

260. Graduate Seminar. (1)

290. Independent Study. (Arr)

293. Research Methods. (3)

295. Research for Master's Thesis. (Arr)

400. Continuing Graduate Advisement. (3)

¹Department of

Industrial and Technical Education

Head: Neill C. Slack, EdD, University of Missouri

Office: Mechanical Arts 104

Degrees offered: MS, MIE, EdD

The department, in cooperation with the College of Education, provides a program leading to the EdD degree in Industrial Education. The department also provides programs leading to the MS in Industrial Education and to the Master of Industrial Education. The graduate degree programs are sufficiently flexible to meet the needs of individuals engaged in the various phases of Industrial Education work. The candidate is given assistance in planning an academic program which will provide cultural and professional development considered essential to education leadership in his chosen field.

Any deficiencies must be made up before a student may be ad-

vanced to candidacy. The degree is awarded only when the candidate's over-all record, including course work, the required examinations, the Master's thesis or report, or the doctoral dissertation, represents creditable accomplishment.

The MS Degree in Industrial Education. This degree provides advanced preparation for Industrial Arts, Trade and Industrial and Technical Education teachers, and for supervisors and administrators of Industrial Education programs.

MIE Degree. This degree provides advanced preparation for those engaged in teaching Industrial Arts, Trade and Industrial or Technical courses, for those who

¹In College of Engineering

supervise these programs, or for those who are Industrial Education administrators. The degree requires additional professional and technical course work in the student's area of specialization in lieu of the Master's thesis. The candidate must complete a scholarly piece of work which is designed as a Master's Report and gains credit through the Readings and Conference course, ITE 267. This report should demonstrate the student's competence in professional writing.

A candidate for this degree is expected to have had successful industrial teaching, supervisory, or administrative experience as evaluated by his supervisory committee.

Required core for the MS and MIE degrees include: Psych 112, ITE 207, 209, 224, 254, 275, 271. For the MIE degree, ITE 200, 267, and nine hours of technical courses are required in lieu of ITE 271.

EdD Degree in Industrial Education. This degree is administered jointly by the Colleges of Education and Engineering for the graduate school. The program is designed for individuals who are presently engaged in one or more of the phases of Industrial Education. For information concerning admission and completion requirements, contact the head of the department.

Industrial and Technical Education Courses

169. Production Techniques. (3)
190. Special Industrial Education Workshop. (Arr)
191. Industrial Safety Education. (3)
192. Personnel Relations. (3)
198. Special Problems in Industrial Education. (Arr)
199. Related Technical Training in Vocational Education. (Arr)
200. Industrial Education Experimental Lab. (Arr)
205. Trade, Industrial, and Technical Workshop. (Arr)
206. Vocational and Technical Administration Workshop. (3)
207. Philosophy of Vocational Education and the Practical Arts. (3)
209. Curriculum Development in Industrial Education. (3)
210. Trends in Industrial Education. (3)
224. History of Industrial Education. (3)
232. Aerospace Education. (Arr)
240. Cooperative Industrial Programs. (3)
245. Organization of Industrial Education Programs. (3)
251. Administration and Supervision of Industrial Education. (3)
254. Measurement in Industrial Education. (3)
261. Problems of Adult Education. (3)
267. Reading and Conference. (Arr)
270. Seminar in Industrial Education. (1)
271. Research and Thesis Writing. (Arr)
275. Research in Industrial and Technical Education. (3)
355. Internship in Industrial and Technical Programs. (Arr)
365. Advanced Independent Study in Industrial Education. (Arr)
371. Research for the Doctorate Thesis in Industrial Education. (Arr)
400. Continuing Graduate Advisement. (3)

¹*Department of*

Instructional Media

(Library Science and Instructional Communication)

Head: Lester C. Essig, Jr., EdD, Indiana University

Office: Library 222

Degree offered: MEd

The Instructional Media Center (IMC) program is a combination of studies in Library Science and Instructional Communications. The IMC concept is the application of Library Science to all educational materials, equipment, and facilities.

Divisions of the American Library Association and the National Education Association (AASL and DAVI) issued joint standards in 1969, stressing the need for a single media agency combining audiovisual and library services into one administrative unit. According to the joint standards, the administrator of this agency (IMC) "must have competencies in both school library and audiovisual areas as well as knowledge in fields of learning theory, communications, curriculum development, supervision and research." The graduate IMC program at USU is specially designed to prepare such IMC specialists.

In recent years, many new types of instructional media have been developed. At the same time, more familiar media such as books, films, and recordings have been made increasingly effective through modern techniques of illustration, improved design, and new production processes. Because of the broad variety of media now available, and with the rapid increase of production within each medium, teachers are faced with a vast reservoir of instructional materials

from which to choose. This means that teachers require more and more assistance from specialists to locate, evaluate, select, produce and use instructional media to best advantage. To provide such help, specialists need to have a working knowledge of the entire range of media, the potential contributions each can make to learning, and effective methods to use.

Utah State Board of Education Media Endorsement Requirements.

The Utah State Board of Education, Division of Instructional Media, has changed librarian and audiovisual certification requirements to comply with the changed demands for media specialists. The former librarian's certification is no longer issued by the State of Utah, but rather the more broadly based media endorsement. To qualify, persons must first be certified as teachers, and secondly meet the requirements for the professional media endorsement requiring the Master's degree in Media from an approved university program or 55 quarter hours of approved graduate credit. Thirty credit hours for the professional endorsement must be in the following areas:

- a) Classifying and Cataloging (all types of media)
- b) Selection and Utilization of Print Materials
- c) Selection and Utilization of AV Materials
- d) Selection and Utilization of Educational TV

¹In College of Education

- e) Selection and Utilization of Programmed Materials
- f) Organization and Procedures (Administration)
- g) Production of Audiovisual Materials
- h) Mass Media
- i) Information Retrieval and Data Processing
- j) Human and Public Relations
- k) Leadership and Supervision
- l) Communication Theory

The Master's degree (IMC) is an approved program for the professional media endorsement at USU.

In addition, the candidates for the professional media endorsement must have three years of successful educational experience, one of which must be in the classroom. Candidates for media endorsement must also receive recommendation from an approved institution of which USU is so qualified.

Master of Education. The MEd program is designed to prepare these needed specialists for positions in libraries and new Instructional Media Centers. The following program meets the requirements for an MEd degree:

MEd in Instructional Media (for students new to the field of Instructional Communication and Library Science with no previous work in the department). Required Courses: IM 101, 111, 112, 121, 132 or 133, 135. Instructional Communication Background: IM 155, 165, 166, 181; Speech 184. Library Science: IM 136, 225. Instructional Communication: IM 191, 251. Education: Elem Ed 204 or Sec Ed 230; Sec Ed 164; Ed Adm 266, 264; Ed 285.

MEd in Instructional Media (for students who were undergraduate Instructional Media minors with emphasis in Instructional Commu-

ication in the department) Required Courses: Library Science Background: IM 101, 112, 132 or 133, 135. Instructional Communication: IM 191, 251; Speech 184; Art 57. Library Science: IM 136, 225; Engl 122 or 123. Education: Elem Ed 204 or Sec Ed 230; Sec Ed 164; Ed Adm 266, 264; Ed 285.

MEd in Instructional Media (for those students who were undergraduate Instructional Media minors with emphasis in Library Science in the department). Required Courses: Instructional Communication Background: IM 156, 166, 181; Speech 181. Instructional Communication: IM 191, 251; Speech 184; Art 57. Library Science: IM 136, 225; Engl 122, 123. Education: Elem Ed 204 or Sec Ed 230; Sec Ed 164, Ed Adm 266, 264; Ed 285.

Instructional Media Courses

- 101. Library Reference Services. (3)
- 106. Public Documents. (3)
- 111. Book Selection. (3)
- 112. Reading Guidance. (3)
- 121. Cataloguing and Classification. (3)
- 122. Technical Library Services. (3)
- 132. Elementary School Library Administration. (3)
- 133. Secondary School Library Administration. (3)
- 135. Library Practice. (3)
- 136. History of Books and Libraries. (3)
- 138. Library Administration Workshop. (1-5)
- 139. Readings and Conferences. (Arr)
- 155. Utilization of Audiovisual Media. (3)
- 156. Instructional Media in Education. (3)
- 165. Production of Audiovisual Materials. (3)
- 166. Local Production of Audiovisual Materials. (3)
- 181. Developing the School's Audiovisual Program. (3)
- 191. Instructional Media Communication Theory. (3)
- 225. Library Science Automation Applications. (3)
- 238. Workshop in Librarianship. (2)
- 251. Evaluation and Selection of Instructional Materials. (3)
- 400. Continuing Graduate Advisement. (3)

¹*Department of*

Landscape Architecture and Environmental Planning

Head: Burton Taylor, MLA, Harvard Graduate School of Design, Cambridge School of Design, Massachusetts Institute of Technology—
Special Study

Office: Main 1

Degrees offered: MS, MLA

The Department of Landscape Architecture and Environmental Planning at USU is accredited by the American Society of Landscape Architects.

Holders of the Bachelor's degree in allied fields may become candidates for the Master of Science or Master of Landscape Architecture, if they satisfactorily complete, or have completed, a minimum of 45 credit hours in Landscape Architecture at the upper division level.

The level at which students enter the graduate program will be determined by an evaluation of their past background and experience.

The MLA degree is a professional terminal degree in Landscape Architecture as established by the American Society of Landscape Architects. It constitutes a one-and-one-half to two-year program, including 60 credit hours in the 200 and 300 series. Special problems in the second year graduate studio in the 300 series are assigned to the student on an individual basis. Certain upper division and graduate courses are required in allied fields.

The MS degree in Environmental Planning encompasses a broader approach to design problems. The graduate degree program is suffi-

ciently flexible to meet the needs of individuals engaged in the various phases of planning. The candidate is given assistance in planning an academic program which will provide cultural and professional development in his chosen field.

A thesis of 10 to 15 credit hours is required, the precise hours being determined jointly by the candidate and the faculty, depending upon the complexity and scope of the chosen subject.

Any deficiencies must be made up before a student may be advanced to candidacy. The degree is awarded only when the candidate's over-all record, including course work, required examinations, the MS thesis or MLA thesis, represents considerable accomplishment.

Special note should be taken of graduate courses LAEP 290, Special Problems, and LAEP 295, Interdisciplinary Seminar. Special Problems is offered on an individual basis for students in other fields who may require graduate credit. Problems are assigned on an individual basis. The Interdisciplinary Seminar is conducted once a year and is made up of professors and students, on a graduate level, from other colleges and departments. Registration by permission only.

¹In College of Humanities and Arts

Landscape Architecture and Environmental Planning Courses

- 130. Park and Recreational Planning. (3)
- 135. Travel Course. (1)
- 140, 141, 142. Landscape Design. (4, 4, 4)
- 150, 151, 152. Planting Design. (3, 3, 3)
- 160, 161, 162. Landscape Construction.
(3, 3, 3)
- 170. City and Regional Planning. (3)
- 180, 181, 182. Advanced Planning and Design.
(4, 4, 4)

- 190. Special Problems. (Arr)
- 195. Readings and Reports on Current Topics
and Trends in LAEP. (1)
- 210, 211, 212. Landscape Architecture. (Arr)
- 220. Thesis. (Arr)
- 290. Special Problems. (Arr)
- 295. Interdisciplinary Seminar. (2)
- 310, 311, 312. Landscape Architecture.
(4, 4, 4)
- 316. Professional Practice. (1)
- 320. Thesis. (Arr)
- 400. Continuing Graduate Advisement. (3)

¹Department of

Manufacturing Engineering

Head: Carl D. Spear, PhD, University of Utah

Office: Engineering L-134

Degree offered: MS

The graduate program in Manufacturing Engineering provides course work leading to the MS degree. To meet individual interests, the graduate student may select one of three options to be taken along with the Manufacturing Engineering core. These options are: Engineering Administration, Manufacturing Systems Design, Applied Statistics and Computer Science. General requirements for the Master's degree are: 1) To be accepted as a candidate, the applicant must a) hold a BS degree from an institution of recognized standing in one of the fields of Engineering or Physical Science, b) have had adequate preparation for graduate study in the chosen field of specialization, and c) show promise of doing well in advanced study as judged by previous scholastic record and other achievements. 2)

The MS curriculum must include at least 45 credit hours in the 100 or 200 series with at least 10 credit hours in the 200 series. A total of nine credit hours of acceptable graduate work may be transferred from another approved graduate school. A maximum of 18 credit hours may be taken at off-campus residence centers maintained by USU. A minimum of 15 credit hours, exclusive of thesis, must be completed on the Logan campus. Additional requirements are outlined in the first part of this bulletin. 3) Selection of specific courses in the curriculum will be under advisement of a Supervisory Committee (see page 15).

The candidate's program will include a selection of courses in the following areas: Manufacturing Engineering core—21 credit hours, thesis — nine credit hours, minor (option in Engineering Adminis-

¹In College of Engineering

tration, Manufacturing Systems Design, or Applied Statistics and Computer Science) — 15 credit hours (minimum).

An integrated program may be selected from the following courses:

Manufacturing Engineering Core: ¹Math 140, 141 142—9 credit hours; ¹Ap St 131, 132, 176—11 credit hours; CS 167—three credit hours; Mfg Engrg 251, 258, 280, 283, 287, 273, 290, and 298 — 30 credit hours.

Engineering Administration: BA 133 or 138—five credit hours; BA 209, 210, 150—11 credit hours; BA 250, 212 — six credit hours; Econ 100—three credit hours.

Manufacturing Systems Designs: Mech Engrg 131, 132, 165 — 12 credit hours; Mech Engrg 161 — three credit hours; Elec Engrg 160

¹Mathematics or Applied Statistics courses may be selected after consultation with adviser.

— four credit hours; Civil Engrg 260—four credit hours.

Applied Statistics and Computer Science: CS 171, 172, 245, 246 — nine credit hours; Ap St 134, 221 — seven credit hours.

Manufacturing Engineering Courses

- 240. Advanced Material Science. (3)
- 248. Advanced Manufacturing Processes. (3)
- 251. Metal Machining. (3)
- 258. Value Engineering. (3)
- 273. Special Problems in Manufacturing Engineering. (Arr)
- 280. Methods Engineering. (3)
- 282. Advanced Production Design. (3)
- 283. Materials Handling. (3)
- 287. Manufacturing Seminar. (1)
- 298. Graduate Thesis. (Arr)
- 400. Continuing Graduate Advisement. (3)

²Department of

Mathematics

Acting Head: Lawrence O. Cannon, PhD, University of Utah

Office: Engineering C-325

Degrees offered: MS, MM

The Department of Mathematics offers both a Master of Science degree and a Master of Mathematics degree. This latter degree is primarily intended for junior college teachers of mathematics, but is also appropriate for secondary school teachers.

The requirements for the MS degree include: 1) 45 credit hours of approved course work beyond the Bachelor's degree, 2) 18 credit hours in courses numbered 200 or

above, 3) completion of a satisfactory thesis, and 4) satisfactory performance on a written examination.

The requirement for the MM degree include: 1) 48 credit hours of approved course work beyond the Bachelor's degree of which 15 hours can be in areas other than Mathematics, 2) completion of an academic year of study of Advanced Calculus and Modern Algebra, 3) satisfactory performance on a final oral examination. (No thesis is required.)

²In College of Science

Mathematics Courses

- | | |
|--|--|
| 110, 111. Ordinary Differential Equations. (3, 3) | 161. Calculus of Probability. (5) |
| 116, 117, 118. Modern Algebra. (3, 3, 3) | 162, 163. Mathematics of Statistics. (5, 5) |
| 120. Modern Geometry. (3) | 164, 165. Linear Algebra. (3, 3) |
| 123. Number Theory. (3) | 216, 217, 218. Topics in Abstract Algebra. (3, 3, 3) |
| 124. Foundations of Mathematics. (3) | 220, 221, 222. Advanced Topics in Algebra. (3, 3, 3) |
| 126. Numerical Methods. (3) | 226, 227, 228. Numerical Analysis. (3, 3, 3) |
| 127, 128. Introduction to Numerical Analysis. (3, 3) | 234, 235, 236. Topology. (3, 3, 3) |
| 130, 131, 132. Advanced Calculus. (4, 4, 4) | 237, 238, 239. Mathematical Physics. (3, 3, 3) |
| 134, 135, 136. Introduction to Topology. (3, 3, 3) | 246. Tensor Analysis. (3) |
| 140. Introductory Linear Analysis. (3) | 247, 248. Differential Geometry. (3, 3) |
| 141, 142. Advanced Engineering Mathematics. (3, 3) | 250. Graduate Seminar. (Arr) |
| 145. Vector Analysis. (3) | 251, 252, 253. Real Variables. (3, 3, 3) |
| 147, 148. Introduction to Complex Variables. (3, 3) | 254, 255, 256. Theory of Functions. (3, 3, 3) |
| 153. Mathematical Readings. (Arr) | 257, 258, 259. Advanced Applied Mathematics. (3, 3, 3) |
| | 260. Graduate Thesis. (Arr) |
| | 400. Continuing Graduate Advisement. (Arr) |

¹Department of

Mechanical Engineering

Head: Russell M. Holdredge, PhD, Purdue University

Office: Engineering L-178

Degrees offered: MS, PhD

This department offers a graduate program leading to the MS degree and the PhD degree in Mechanical Engineering. The PhD program is supported by research capability in Civil Engineering, Electrical Engineering, National Reactor Testing Station, and Industries.

The Master's degree program allows for specialization in one of the following areas: Applied Me-

chanics, Fluid Dynamics, Nuclear Engineering, Materials, Gas Dynamics, Energy Conversion, Heat Transfer, and Thermodynamics.

Research and teaching assistantships are available for qualified graduate students. In addition, some financial assistance is available through NSF, NASA, NDEA, and other governmental agencies as well as some industrial firms.

A tentative course of study will be selected by the student after consultation with the department

¹In College of Engineering

graduate committee. As soon as practical after matriculation, the student must arrange with the department head for the appointment of a committee to advise him throughout the remainder of his course of study.

Mechanical Engineering Courses

202. Theory of Plasticity. (3)

205. Introduction to Elasticity. (3)

206. Theory of Elasticity. (3)

210. Transport Phenomena. (3)

211, 212. Advanced Thermodynamics IV and V. (3, 3)

216, 217, 218. Advanced Heat and Mass Transfer. (3, 3, 3)

230. Advanced Kinematics. (3)

240, 241, 242. Intermediate Gas Dynamics. (3, 3, 3)

261, 262. Theory of Vibrations. (3, 3)

273. Special Problems in Mechanical Engineering. (Arr)

290, 291, 292. Nuclear Reactor Engineering Principles. (3, 3, 3)

293, 294, 295. Nuclear Reactor Laboratory. (1, 1, 1)

298. Graduate Thesis. (Arr)

400. Continuing Graduate Advisement. (3)

¹Department of

Music

Head: Max F. Dalby, EdD, Utah State University

Office: Fine Arts Center 109

Degrees offered: MM, MA, EdD (Curriculum Development and Supervision)

Qualified graduates from accredited degree-granting institutions in Music may be admitted as candidates for graduate degrees in Music.

Different Masters' degrees are offered: Master of Music and Master of Arts. The MA degree requires two years of foreign language study. For each degree, the student may select courses of study leading to a) a major in Music Education or b) a major in Applied Music.

Each candidate must successfully complete an examination for admission to the program of graduate study in Music. This examination may be taken under the supervision

of a proctor at a college or school designated by the University Department of Music and near the candidate's place of residence.

Students may elect a thesis project, a lecture-recital or concert-recital. All work is to be completed under the supervision of a graduate committee.

Before being admitted as a candidate, a singer must show acquaintance with solo literature for his voice. His repertory must include:

- 1) representative solos for his voice from the standard oratorios;
- 2) representative arias for his voice from the standard operas;
- 3) standard and contemporary solo repertory from Italian, French,

¹In College of Humanities and Arts

German, and American sources.

Requirements leading to the MM and MA degree are: 1) Required - Music 201, 258, 259, 280, 287; Ed 230, 260; Psych 200. 2) Supporting minor area (electives 15 credit hours) - Music 108, 109, 110, 114, 115, 116, 149, 205, 212, 251, 252, 254, 255. Applied Music requirements are: 1) Required - Music 201, 205, 212, 258, 259, 280, and 287. 2) Supporting minor area (electives six credit hours) - same as above.

Doctor of Education Degree.

This department cooperates with other departments in offering the Doctor of Education degree in Curriculum Development and Supervision with specialization in Music. The degree is designed for those preparing for Music curriculum coordinators or supervisors, and college teachers. For additional information, write to the head of the department or the Chairman of Doctor of Education Committee in Curriculum Development and Supervision in the College of Education.

Music Courses

- 101, 102, 103. Music History and Literature. (3, 3, 3)
- 104, 105. Advanced Theory. (3, 3)
- 106. Form and Analysis. (3)
- 107. Scoring and Arranging. (3)
- 108, 109, 110. Counterpoint. (3, 3, 3)
- 114, 115, 116. Composition. (3, 3, 3)
- 124. Chamber Orchestra. (1)
- 129. Stage Band Workshop. (3)
- 135. Opera Staging and Production. (1-3)
- 138. Readings in Choral Literature. (1)
- 140. Choral Conducting. (3)
- 141. Instrumental Conducting. (3)
- 149. Music for the Secondary Schools. (3)
- 150. Music for Elementary Schools. (3)
- 151. Secondary School Choral Methods and Materials. (3)
- 153. Secondary School Instrumental Methods and Materials. (3)
- 155. Piano Teaching Methods. (1)
- 156, 157, 158. Vocal Repertory. (2, 2, 2)
- 163. Piano Workshop. (1)
- 201. Introduction to Musicology. (3)
- 205. Special Problems in Music. (1-3)
- 212. Twentieth-Century Music. (3)
- 235. Opera Workshop (Advanced). (1-3)
- 251. Advanced Choral Methods. (1)
- 252. Advanced Orchestra Methods. (1)
- 254. Teaching Stringed Instruments. (3)
- 255. Band Symposium. (3)
- 258. Seminar in Music Education. (3)
- 259. Seminar in Music Theory. (3)
- 280. Seminar in Music Literature. (3)
- 285. Research and Thesis. (Arr)
- 287. Individual Recital. (Arr)
- 400. Continuing Graduate Advisement. (3)

¹*Department of*

Physics

Head: W. Farrell Edwards, PhD, California Institute of Technology

Office: Engineering 152

Degrees offered: MS, PhD

Master of Science Degree. A candidate for the MS degree in Physics must take an entrance examination administered by the department prior to registration. A student may be required to register for one or more undergraduate courses to correct any deficiencies which appear upon analysis of the student's work on this examination. The candidate is also required to take a comprehensive examination, administered by the department, during the Spring Quarter of the student's first year of residence. This examination covers undergraduate and first-year graduate Physics with an emphasis upon Mechanics, Electromagnetic Theory and Quantum Mechanics. A candidate is also required to complete at least two of the first-year graduate courses in these three subjects. In addition, the student will submit either a thesis or a research report at the discretion of the student's supervisory committee.

Doctor of Philosophy Degree. The Physics Department in cooperation with related departments offers the PhD degree. A brief summary of the Philosophy degree program in Physics includes the following: 1) an entrance exam prior to registration; 2) a qualifying exam over undergraduate and first-year graduate Physics during Spring Quarter of the first year; 3) a graduate comprehensive exam with emphasis on Quantum Mechanics, Electricity and Magnetism and Classical Mechanics usually at

the beginning of the third year; 4) an examination conducted by the Language Department in German, French, or Russian; 5) a thesis and a thesis defense.

Physics Courses

- 110, 111, 112. Astrophysics. (3, 3, 3)
- 122. Modern Physics. (3)
- 125, 126, 127. Modern Physics. (4, 4, 4)
- 130. Nuclear Physics. (3)
- 131. Nuclear Detection Methods. (2)
- 143. Radiobiology. (3)
- 153, 154, 155. Analytical Mechanics. (3, 3, 3)
- 156, 157, 158. Introduction to the Theory of Relativity. (2, 2, 2)
- *160, 161, 162. Thermal Physics. (3, 3, 3)
- *166, 167, 168. Wave Theory and Optics. (3, 3, 3)
- 175, 176, 177. Electricity and Magnetism. (3, 3, 3)
- 181. Mechanics Laboratory. (1)
- 182. Electricity and Magnetism Laboratory. (1)
- 183. Atomic Physics Laboratory. (1)
- 184. Optics Laboratory. (1)
- 188. Special Problems in Experimental Physics. (1-3)
- 196, 197, 198. Selected Reading in Physics. (1, 1, 1)
- 200, 201, 202. Study of the Structure and Properties of Solids. (3, 3, 3)
- 204, 205, 206. Invited Lectures. (1, 1, 1)
- 210, 211. X-ray Diffraction and X-ray Crystallography. (3, 3)

¹In College of Science

*Taught 1970-71

214. Soil Physics. (See Plant Science 214)
- 220, 221, 222. Atomic Spectra, Molecular Spectra, Molecular Spectra and Spectrographic Measurements. (3, 3, 3)
- 230, 231, 232. Nuclear Physics. (3, 3, 3)
235. Elementary Particle Physics. (3)
250. Research in Physics. (Arr)
- 260, 261, 262. Thermodynamics, Kinetic Theory, Statistical Thermodynamics. (3, 3, 3)
- 270, 271, 272. Quantum Field Theory. (3, 3, 3)
- 275, 276, 277. Relativity and Cosmology. (3, 3, 3)
- 285, 286, 287. Introductory Quantum Mechanics. (3, 3, 3)
288. Introductory Quantum Mechanics. (3)
- 290, 291, 292. Theoretical Mechanics. (3, 3, 3)
- 293, 294, 295. Graduate Seminar. (Arr)
- 296, 297, 298. Theoretical Electricity and Magnetism. (3, 3, 3)
400. Continuing Graduate Advisement. (3)

¹Department of

Plant Science

(Agronomy, Crop Science, Food Technology, Ornamental Horticulture, Pomology, Vegetable Crops)

Head: Frank B. Salisbury, PhD, California Institute of Technology; postdoctoral work, Universities of Tübingen and Innsbruck

Office: Agricultural Science 322

Degrees offered: MS, PhD

Master of Science Degree. The department, in cooperation with related departments, offers MS programs in Plant Breeding, Crop Physiology, Crop Production and Management, Weeds and Weed Control, and Plant Nutrition.

Doctor of Philosophy Degree. The department, in cooperation with related departments, offers the PhD degree in Plant Nutrition, Crop Management, Plant Breeding, and Crop Physiology. Detailed information may be obtained from the Department of Plant Science.

Plant Science Courses

100. Propagation, Pruning, and Grafting. (3)
103. Forage Crops. (4)
- **104. Vegetable Production. (3)

105. Turf Management. (2)
107. Grain Crops. (3)
108. Root and Miscellaneous Crops. (3)
109. Plant Breeding. (4)
111. Ornamental Horticulture. (3)
- *115. Dry Farming. (2)
117. Fruit Production. (3)
118. Flower Arranging for the Home. (3)
119. Weed Science. (4)
- *120. Seed Production. (4)
131. Agricultural Sprays and Dusts. (5)
197. Special Problems. (Arr)
- *201. Hay and Pastures. (3)
- *204. Advanced Vegetable Production. (4)
- **208. Advanced Field Crops. (3)
- *209. Advanced Plant Breeding. (3)
- *217. Advanced Pomology. (4)
- *219. Biochemical Basis of Herbicidal Action. (3)
- *222. Control of Reproduction in Plants. (3)
- **223. Crop Ecology. (3)
- **260. Methods in Plant Science Research. (2)
297. Special Problems. (Arr)
298. Research and Thesis. (Arr)
299. Graduate Seminar. (1)
400. Continuing Graduate Advisement. (3)

*Taught 1970-71

**Taught 1971-72

¹In College of Agriculture

¹Department of

Political Science

Head: JeDon A. Emenhiser, PhD, University of Minnesota

Office: Main 250

Degrees offered: MS, MA

The department offers work leading to the Master of Science and Master of Arts degrees in Political Science.

Political Science Courses

- | | |
|--|--|
| <p>101. American Foreign Policy. (3)</p> <p>102. International Political Relations. (3)</p> <p>110. Basic Problems in International Relations. (3)</p> <p>111. International Government. (3)</p> <p>114. Intergovernmental Relations. (3)</p> <p>115. Problems of Utah Government. (3)</p> <p>117, 118, 119. American Political Thought I, II, III. (2, 2, 2)</p> <p>122. The American Presidency. (3)</p> <p>123. Political Surveys. (3)</p> <p>124. Public Opinion and Policy Formulation. (3)</p> <p>125. Political Parties and Practical Politics. (5)</p> <p>126. Polimetrics. (3)</p> <p>128. International Law. (5)</p> <p>131. Administrative Law. (3)</p> <p>136, 137, 138, 139. Constitutional Law I, II, III, IV. (3, 3, 3, 3)</p> <p>140. American Legislative Process. (5)</p> <p>144. The Judicial Process. (3)</p> <p>145, 146, 147. History of Political Thought I, II, III. (3, 3, 3)</p> <p>151. Introduction to Public Administration. (3)</p> <p>152. Public Personnel Administration. (3)</p> | <p>153. Public Finance Administration. (3)</p> <p>154. Public Administration Internship. (2)</p> <p>159. Ethics of Society and Law. (3)</p> <p>160. Elements of Politics. (3)</p> <p>167. The American Legal System. (3)</p> <p>168. Theory of Jurisprudence. (3)</p> <p>170. Major Governments of Europe. (3)</p> <p>171. Politics of Mainland China. (5)</p> <p>173. Soviet Government and Politics. (3)</p> <p>174. Politics of the Communist Bloc. (3)</p> <p>175. Political Systems in South and Southeast Asia. (3)</p> <p>176. Politics of Underdeveloped Areas. (3)</p> <p>177. Politics of South America. (3)</p> <p>178. Politics of Central America. (3)</p> <p>179. Latin America in Foreign Affairs. (3)</p> <p>180, 181, 182. Current Political Problems. (2, 2, 2)</p> <p>195. Library Resources of Political Science. (2)</p> <p>201. Research in Political Science. (Arr)</p> <p>203. Readings and Conference. (Arr)</p> <p>205. Methods in Political Science. (3)</p> <p>211. Thesis. (Arr)</p> <p>220. Seminar in Comparative Politics. (3)</p> <p>230. Seminar in Public Law. (3)</p> <p>240. Seminar in American Politics. (3)</p> <p>250. Seminar in Political Theory. (3)</p> <p>260. Seminar in Public Administration. (3)</p> <p>270. Seminar in Foreign Affairs. (3)</p> <p>400. Continuing Graduate Advisement. (3)</p> |
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¹In College of Social Sciences

¹Department of

Psychology

Head: Heber C. Sharp, PhD, University of Utah

Office: Education 300

²Degrees offered: MA, MS, MEd, EdD, PhD

MS Degree in Psychology. The department offers the MS degree in nine areas: 1) General Experimental, 2) Developmental, 3) Educational, 4) School Psychologist, 5) Counseling, 6) Animal Behavior, 7) Physiological Psychology, 8) Social Psychology, and 9) Learning and Motivation. In addition to these nine areas of Psychology, a course of study leading to the MS or MEd degree in Counseling and Guidance is outlined below.

Committee approval for entrance into MS programs in Psychology is based upon appraisal of 1) the student's undergraduate transcript, including 45 credit hours in Psychology courses (General, Experimental, Developmental, Physiological, Sensory Basis of Behavior, Social, Abnormal, Learning, Statistics, Psychometrics, and either Education or Industrial Counseling), and 2) scores on the Graduate Record Examination or Miller Analogy Test.

The following core of courses is required in each area: Education 267; Psychology 171, 212, 215, 280, 191, and 217. In addition to this core, courses totaling a minimum of 45 credit hours are recommended in the respective areas of specialization:

1) **Experimental:** Psych 170, 174, 175, 271, 274, 275, and 276.

2) **Developmental:** Psych 123, 172, 200, 202, 205, 221, 224, 225, 235, and 238.

3) **Educational:** Psych 123, 172, 200, 221, 224, 225, 227, 235, and 238.

4) **School Psychologist:** Ed 123, 172, 200, 221, 224, 225, 235, 238, 282, 283, 284, 285, 286, 287, 288, 289; Sp Ed 186, 288.

5) **Counseling:** Psych 172, 200, 224, 225, 282, 283, 284, 286, 287, 288, 289, and 290.

6) **Animal Behavior:** Psych 174, 175, 271, 274, 275, and 276.

7) **Physiological Psychology:** Psych 174, 175, 271, 274, 275, and 276.

8) **Social Psychology:** Psych 170, 180, 261, 262, 264, and 265.

9) **Learning and Motivation:** Psych 170, 174, 175, 180, 200, 227, and 271.

Modifications. The courses of study outlined above are recommended as guides to both the student and his committee. However, each student — with the approval of his graduate committee — will find it possible to make minor adaptations of the outlines to meet his special interests and needs.

Master's Degree in Counseling. Three types of degrees are presently available: 1) an MS degree in Psychology, with a major emphasis in Counseling, 2) an MS degree in Counseling Psychology, and 3) an MEd in Counseling and Guidance. The essential difference in these three tracks is the amount

¹In College of Education

²Some revision is underway for the graduate programs. The student should consult his major professor or the head of the department.

of undergraduate course work in Psychology. Essentially, the MS in Psychology requires a Bachelor's degree, or 45 credit hours of undergraduate Psychology; the MS in Counseling Psychology requires only 37 credit hours of undergraduate Psychology and Education with the remainder of undergraduate prerequisites allowable in education and/or other disciplines; and the MEd in Counseling and Guidance requires not less than 17-31 credit hours of undergraduate Psychology and Education, with the remainder of undergraduate prerequisites being allowed in Education and/or other disciplines. Students entering graduate training in Counseling are advised into the particular program track which seems most appropriate in terms of their previous training, as well as their present and anticipated interests for a greater emphasis either in Educational Counseling and Guidance, or in Psychological Counseling and School Psychology. Outlines of the specific prerequisite requirements and the Master's degree requirements may be procured from the Psychology Department, Division of Counselor Education.

MS Degree in Psychology-Speech Pathology. The Department of Communicative Disorders, in cooperation with the Department of Psychology offers a composite MS degree in Psychology-Speech Pathology. The course of study includes courses jointly approved by the two departments.

Certification as a School Counselor. Institutional endorsement for counseling certification is given to qualified applicants who successfully complete either the Master's degree program or in lieu of the Master's degree, the minimum number of graduate credit hours and specified course areas required by the state for the Professional

Counselor's Certificate. All applicants seeking institutional endorsement for certification are expected to meet the general qualifications for admission to graduate school. Even though the applicant is a nondegree candidate, he must apply and be accepted into the graduate school as such in order to pursue institutional endorsement for either the Basic Professional or Professional Certificate. Course outlines relative to counselor certification may be procured from the Psychology Department, Division of Counselor Education.

Doctorate in Educational Psychology. The Department of Psychology, in cooperation with the departments of Education, has planned a program of advanced graduate study in Counseling, School Psychology and Educational Psychology that leads to the EdD degree in Educational Psychology.

The program requires a minimum of two years of graduate study beyond the MS degree, including supervision of individual study and an internship in schools, mental hygiene clinic, or social agency.

PhD Programs in Psychology. The department offers PhD programs with specialization in the following areas: 1) Animal Behavior, 2) Child and Developmental Psychology, 3) Learning and Motivation, 4) Physiological Psychology, 5) Social Psychology. For a description of the programs, contact the department head.

Committee approval for entrance into any one of the doctorate programs is based upon appraisal of 1) the student's undergraduate transcript; with a minimum of 40 credit hours in areas of General Psychology; 2) scores on the Graduate Record Examination; and 3) a Master's degree in Psychology.

Psychology Courses

100. Human Growth and Development. (3)
101. Experimental Child Psychology. (3)
106. Educational Psychology. (3)
112. Application of Statistics to Education and Psychology. (3)
117. Research and Readings. (2)
118. Teacher Training Program. (2)
120. Improving Personal Reading Efficiency. (3)
123. Psychology of Exceptional Children. (3)
127. Psychology of Learning. (3)
128. Thinking and Verbal Behavior. (3)
129. Guidance in the Schools. (3)
140. Abnormal Psychology. (3)
145. Mental Hygiene. (3)
155. Psychology of Business and Industry. (3)
156. Problems in Industrial Psychology. (3)
161. Social Psychology. (3)
170. Perception. (3)
171. Advanced Experimental Analysis of Behavior (Theory). (2)
172. Motivation. (3)
173. Advanced Experimental Analysis of Behavior (Research). (2)
174. Sensory Basis of Behavior. (3)
175. Physiological Psychology. (3)
180. Theoretical Explanation of Personality. (3)
181. Psychometrics. (5)
191. History and Systems of Psychology. (3)
200. Principles of Learning. (3)
201. Advanced Experimental Child Psychology. (3)
202. Psychology of Adolescence. (3)
205. Child Psychology and Development. (3)
212. Advanced Applications of Statistics to Education and Psychology. (3)
214. Independent Readings in Psychology. (2)
215. Seminar Discussion of Current and Special Topics in Psychology. (2)
217. Research for Master's Thesis in Psychology. (Arr)
224. Characteristics of the Mentally Retarded. (3)
225. Characteristics and Education of the Gifted Child. (3)
227. Theories of Learning. (3)
235. Observation and Case Analysis in Play Therapy. (3)
238. Practicum in Play Therapy. (2)
250. Psychological Aspects of Sports Performance. (2)
257. Career Information in Counseling and Teaching. (3)
261. Advanced Social Psychology. (3)
262. Social Psychology of Teaching. (3)
See Ed Adm 262. Organization and Administration of Guidance. (3)
263. Attitudes and Attitude Measurement. (3)
264. Experimental Social Psychology. (3)
265. Culture and Personality. (3)
266. Small Group Analysis. (3)
267. Theories of Vocational Development. (3)
See Ed Adm 267. Research in Psychology and Education. (3)
271. Seminar in Conditioning Techniques. (3)
272. Seminar in Motivation in the World of Work. (3)
274. Sensory Basis of Behavior. (3)
275. Advanced Physiological Psychology. (3)
276. Comparative Psychology. (3)
280. Personality. (3)
282. Individual Diagnostic Intelligence Testing. (3)
283. Principles and Techniques of Counseling. (3)
284. Theories of Counseling. (3)
285. Introduction to Projective Methods of the Study of Personality. (3)
286. Group Procedures in Counseling and Guidance. (3)
288. Practicum in Counseling. (3)
289. Practicum in Psychological Testing. (3)
290. Internship in Counseling and Guidance. (6)
297. Workshop in Guidance. (3)
298. Techniques of Programming. (3)
300. Psychological Foundations of Education. (3)
305. Advanced Child Psychology. (3)
301. Seminar in Experimental Child Psychology. (3)
302. Research in Experimental Child Psychology. (3)
314. Advanced Independent Study in Psychology. (Arr)
315. Doctoral Colloquium. (3)
317. Research for the Doctorate Thesis in Psychology. (Arr)
323. Advanced Exceptional Child. (3)
381. Psychometric Theory. (3)
386. Problems in Counseling. (3)
387. Clinical Internship. (3-6)
388. Internship in School Psychology. (3)
400. Continuing Graduate Advisement. (3)

¹*Department of*

Range Science

Head: Cyrus M. McKell, PhD, Oregon State University

Office: Forestry-Zoology 161

Degrees offered: MS, PhD

The MS degree and the PhD degree are offered in Range Science and related fields such as Plant Ecology, Watershed Science, Range Economics, and Game-Range Management. The program of instruction and research leading to these degrees is available only to students meeting high scholastic standards and who are accepted by the department staff. Students desiring entrance to these graduate programs should contact the department head for information concerning eligibility.

Cooperation with other departments and research centers of the University and with government collaborators permits strong graduate programs in all phases of range-related sciences. Particular mention should be made of the University's Ecology Center, in which the Range Department is very active, the Utah Agricultural Experiment Station which has a full program in both applied and basic range research, the Center for Water Resources Research sponsoring range watershed research, the Utah State Division of Fish and Game program cooperating in big game-range research, and the U.S. Forest Services Intermountain Forest and Range Experiment Station which maintains a research center on the campus for range and watershed research.

There are available to graduate students a number of assistantships and fellowships which will defray most of the costs of attending

school, including exemption from nonresident tuition fees. The department qualifies under the National Defense Education Act, University Fellowships, and National Science Foundation programs. Teaching assistantships and research assistantships, which are attached to existing faculty research programs, involve part-time work in the departments.

Students interested in financial aid for graduate training should write to the department head for details early in the school year preceding initiation of graduate work.

Watershed Science Unit. Watershed Science is concerned with water-oriented aspects of Natural Resource Management, with emphasis on Wildland Resource Management. Precipitation patterns, interception, overland flow and runoff, sediment production, water use by plants, and water yield are just a few important wildland water resource problems which must be examined to meet ever new and challenging demands for water quantity and quality. Demand for individuals who aspire to work in this field is high.

The Watershed Science Unit, in the College of Natural Resources, administers programs in Watershed Science and Watershed Management at the undergraduate and graduate levels. Options are available, emphasizing Watershed Management in conjunction with either a Range or Forestry background.

¹In College of Natural Resources

90 *Secondary Education*

Range Science Courses

- 126. Plant Ecology. (5)
- 130. Grassland Communities. (3)
- 131. Forest Range Communities. (4)
- 132. Desert Plant Communities. (3)
- 160. Applied Range Science. (5)
- 161. Range Analysis Techniques. (2)
- 162. Range Management. (5)
- 163. Range Improvement. (3)
- 164. Technical Problems in Range Management. (3)
- 170. Range Land Appraisal. (3)
- 181. Range Economics. (3)
- 193. Range Seminar. (2)
- 194. Range Seminar. (2)
- 195. Range Problems. (1-3)
- 196. Range Field Problems. (3)
- 200. Range Thesis. (1-15)
- 202. Readings and Conferences. (1-3)
- 204. Land Use Seminar. (2)
- 205. Seminar in Range Nutrition. (3)

- *206. Research Methods. (3)
- 207. Graduate Seminar. (1)
- *210. Plant Autecology. (3)
- *211. Plant Synecology. (3)
- **215. Plant Geography. (3)
- **221. Plant Ecophysiology. (3)
- 231. Systems Ecology. (3)
- **281. Advanced Range Economics. (2)
- 400. Continuing Graduate Advisement.

Watershed Science Courses

- 180. Watershed Management. (4)
 - 190. Watershed Instrumentation. (3)
 - 191. Forest and Range Hydrology. (4)
 - 202. Watershed Science Seminar. (1)
 - 208. Watershed Science Problems. (1-3)
 - 240. Watershed Science Thesis. (1-15)
 - 275. Snowpack Management. (2)
 - 280. Watershed Analysis. (3)
 - 400. Continuing Graduate Advisement.
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- *Taught 1970-71
 - **Taught 1971-72

¹Department of

Secondary Education

Head: Kenneth C. Farrer, EdD, University of Utah

Office: Education 206

Degrees offered: MEd, MS, MA, EdD (Curriculum Development and Supervision)

Masters' Degrees. The department offers programs leading to the degrees of Master of Education, Master of Science, and Master of Arts. These degrees are designed to provide training for those preparing to become master teachers, supervisors, and curriculum spe-

cialists. Each program provides for a core of courses in Education and Psychology and advanced training in the candidate's field. Candidates should matriculate in the Department of Secondary Education.

Approved majors for the Master's degree in Secondary Education include: Secondary School

¹In College of Education

Supervision, Secondary School Teaching, Art Education, Drama Education, Music Education, Speech Education, Biological Science Education, General Science Education, Physical Science Education, Social Studies Education, English Education, and Mathematics Education.

Doctor of Education Degree.

This department cooperates with other departments in offering the EdD degree in Curriculum Development and Supervision with specialization in Secondary Education. The degree is designed for those preparing for Secondary Education curriculum coordinators or supervisors, and college teachers. For additional information, write to the head of the department or the Chairman of Doctor of Education Committee in Curriculum Development and Supervision in the College of Education.

Secondary Education Courses

- 164. Measurements and Evaluations in Education. (3)
- 186. Diagnosis and Treatment of Learning Difficulties. (3)
- 230. Secondary School Curriculum. (3)
- 232. Aerospace Education. (3)
- 233. The Junior High School. (3)
- 237. Seminar in Secondary Education. (2)
- 240. Improvement of English in the Junior and Senior High School. (3)
- 241. The Improvement of Social Studies in the Secondary School. (3)
- 242. The Improvement of Science in the Secondary School. (3)
- 243. The Improvement of Mathematics in the Secondary School. (3)
- 256. Social Studies Curriculum. (3)
- 258. Practicum in the Evaluation and Improvement of Instruction. (3)
- 259. Supervising Student Teaching. (3)
- 264. Instructional Leadership in Education. (3)
- 266. Introduction to Research in Education. (3)
- 267. Research in Psychology and Education. (3)
- 283. Reading and Conferences. (Arr)
- 285. Research and Thesis Writing. (Arr)
- 364. Theories of Teaching. (3)
- 365. Curriculum Development. (3)
- 366. Internship in School Supervision. (Arr)
- 385. Field Studies and Thesis. (Arr)
- 400. Continuing Graduate Advisement. (3)

¹Department of

Sociology, Social Work and Anthropology

Head: Tharel R. Black, PhD, University of Wisconsin

Office: Main 230

Degrees offered: MS, PhD

The department offers courses leading to the MS and PhD degrees in Sociology. Research is promoted through departmental relationship

with the Agricultural Experiment Station, with the Division of University Research, with state and federal agencies, and with private organizations.

¹In College of Social Sciences

PhD Degree. This degree is offered in Sociology through collaboration with closely related departments in the Social Sciences, the Department of Applied Statistics, and departments having Natural Resource studies.

Instruction is comprehensive in its coverage of the general areas of Sociological Theory, Methodology, Social Organization, Social Deviance and Disorganization, Social Psychology, Demography, Human Ecology, and Cultural Anthropology. Special areas of concentration are areas of department and staff research programs.

For the PhD degree, facility in one global foreign language is required. In addition, the candidate must have a reading knowledge of a second foreign language or obtain training beyond the minimum standard in statistics.

Assistantships, Fellowships, and Financial Assistance Available to Students. Assistantships, fellowships, and other financial assistance to students are provided by funds from University Research, University Teaching, the Agricultural Experiment Station, the National Science Foundation, Department of Health, Education and Welfare in cooperation with the Utah Department of Health and Welfare, Center for Water Resources Research, the Bureau of Land Management, Agency for International Development (AID), and Organization of American States (OAS).

Sociology Courses

100. Educational Sociology. (3)
110. Utah Social Problems Seminar. (1)
140. Social Psychology. (3)
141. Rural Community Organization and Leadership. (3)
144. Woman Today. (3)
145. Alcoholism. (3)
153. History of Social Thought. (5)
154. Population Problems. (3)
155. World Population Problems. (3)
156. Social Institutions. (3)
158. Human Relations in Industry. (3)
159. Industrial Sociology. (3)
161. Modern Social Problems. (3)
170. Intermediate Sociology. (5)
171. Juvenile Delinquency. (3)
172. Delinquency Prevention. (3)
174. Criminology. (3)
176. Development of Sociological Theory. (3)
180. Group Dynamics. (3)
184. Social Change. (3)
186. Methods of Social Research. (3)
187. Sociology of Natural Resources. (3)
188. Sociology of Leisure. (3)
189. Human Ecology. (3)
190. Seminar in Sociology. (1)
191. Legal Obligations in Husband-Wife Relations. (2)
192. Legal Obligations in Parent-Child Relations. (2)
195. Urban Sociology. (3)
196. Race Relations. (3)
197. Social Stratification. (3)
199. Social Disorganization. (3)
201. Research in Sociology. (Arr)
202. Advanced Sociological Theory. (5)
203. Independent Readings in Sociology. (Arr)
207. Graduate Seminar. (2)
210. Advanced Rural Sociology. (3)
225. Sociology of Deviant Behavior. (3)
245. Sociology of Consumer Behavior. (3)
286. Survey Research. (3)
288. Practicum in Sociological Research. (Arr)
289. Methods of Population Research. (Arr)
290. Methods of Population Analysis. (3)
400. Continuing Graduate Advisement. (3)

Social Work Courses

- 100. The Field of Social Work. (3)
- 101. Introduction to Field Work. (2)
- 110. Mental Health. (3)
- 120. Child Welfare. (3)
- 140. Public Welfare. (3)
- 150. Introduction to Case Work. (3)
- 152. Social Work Methods. (3)
- 155. Field Experience. (2 or Arr)
- 172. Delinquency Prevention. (3)
- 177. Treatment of Children with Problems. (3)
- 178. Adolescence. (3)
- 180. Group Dynamics. (See Soc 180)
- 195. Social Work Seminar I. (1)
- 197. Service to the Aged. (3)
- 198. Corrections. (3)

- 203. Independent Readings in Social Work.
(Arr)

Anthropology Courses

- 105. Comparative Value Systems. (3)
- 160. Comparative Family Systems. (3)
- 161. Anthropology of Race. (2)
- 162. Religion, Society and the Individual. (3)
- 163. People's Mesoamerica. (3)
- 165. Culture and Personality. (3)
- 166. American Indian Ethnology. (3)
- 167. North American Prehistory. (3)
- 168. Readings and Conferences. (Arr)
- 169. Archeological Methods and Field Work.
(Arr)
- 268. Independent Studies in Anthropology.
(Arr)
- 269. Psychological Anthropology. (3)

¹Department of

Soils and Meteorology

Head: R. L. Smith, PhD, University of California at Los Angeles

Office: Agricultural Science 148

Degrees offered: MS, PhD

Master of Science Degree. The department, in cooperation with related departments, offers MS programs in Soil Physics, Soil Chemistry, Soil Fertility, Plant Nutrition, Soil Genesis, Soils and Irrigation, Biometeorology, and Climatology.

Doctor of Philosophy Degree. The department, in cooperation with related departments, offers the PhD degree in Soil Physics, Soil Chemistry, Soil Fertility, Plant Nutrition, Soil Genesis, Soils and Irrigation, Biometeorology, and Climatology. Detailed information

may be obtained from the Department of Soils and Meteorology.

Fellowships and Traineeships. The department has National Defense Education Act (NDEA) Fellowships and National Science Foundation (NSF) Traineeships that are awarded on the basis of national competition.

Assistantships and Major Professors. Acceptance of a student to pursue graduate study does not grant him an assistantship or the right to study under a particular professor. Assistantships are awarded to accepted students by the professor having funds to cover specific research. Funds are not

¹In College of Agriculture

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available to provide all students with assistantships. Some students who wish to do graduate work may be accepted if they do not desire financial assistance. Permission to study under a particular professor may be granted by the professor in question, after consultation with the student.

Soils Courses

- 105. Chemistry of Soil Water Systems. (3)
- 107. Irrigated Soils. (3)
- 110. Soil Microbiology. (See Bact 110.) (2)
- 114. Soil Identification and Interpretation. (5)
- *115. Tropical Soils. (2)
- 155. Soil and Plant Nutrition. (3)
- 156. Soil and Plant Nutrition Laboratory. (1)
- 165. Physical Properties of Soils. (3)
- 166. Physical Properties of Soils Laboratory. (2)
- **177. Chemical Analysis of Soils. (2)
- 198. Special Problems. (Arr)
- 199. Soil Seminar. (1)
- 210. Advanced Soil Biochemistry and Microbiology. (1)
- *214. Soil Physics. (3)
- **215. Physical Chemistry of Soils. (3)
- 219. Saline and Alkali Soils. (2)
- *221. Genesis. Morphology and Mineralogy of Soils. (3)
- *224. Soil Chemistry. (3)

- 230. Research and Thesis. (Arr)
- 298. Special Problems. (Arr)
- 299. Seminar. (1)

Meteorology Courses

- 117. Weather and Climate. (4)
 - **120. Topographical Climatology. (3)
 - 125. Bioclimatology. (3)
 - *126. Environmental Climatology. (3)
 - *129. Meteorological Oceanography. (3)
 - **130. Observations and Instruments. (3)
 - *131. General Physical Meteorology. (3)
 - *132. General Dynamic Meteorology. (3)
 - *133. General Synoptic Meteorology. (5)
 - **134. Atmospheric Phenomena. (3)
 - **141. Tropical Climatology. (Arr)
 - *145. Paleoclimatology. (Arr)
 - *170. Air Pollution Climatology. (3)
 - *171. Cloud and Precipitation Physics. (3)
 - 175. Boundary-layer Meteorology. (3)
 - **180. Methods in Applied Climatology. (3)
 - 198. Special Problems. (Arr)
 - 199. Seminar. (1)
 - **225. Applied Climatology. (3)
 - *226. Instrumentation Laboratory. (3)
 - 230. Research and Thesis. (Arr)
 - **241. Physical Climatology. (3)
 - **242. Mountain Climatology. (Arr)
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- *Taught 1970-71
**Taught 1971-72

¹*Department of*

Special Education

Head: Marvin G. Fifield, EdD, Washington State University; post-doctoral work, Idaho State University and Brigham Young University

Office: Richards Hall 514-A

Degrees offered: MS, MEd, EdD (Curriculum Development and Supervision)

The department offers programs leading to Master of Science or Master of Education degrees in seven areas: 1) Mental Retardation, 2) Behavior Disorders, 3) Learning Difficulties, 4) Cultural Disadvantage, 5) American Indian Education, 6) Gifted, and 7) Educational Audiology (in cooperation with the Department of Communicative Disorders). Special certification may be obtained in teaching mentally retarded, learning disabilities, and hard-of-hearing. Certification standards for teaching the emotionally disturbed are pending administrative action, but the department's program will meet the requirements when they are published. A minimum of six credit hours in field experience or practice teaching is required for certification.

Programs of study for Master's degrees in Special Education are outlined in the General Catalog.

Special Education Courses

- | | |
|--|---|
| <p>101. Materials Lab in Special Education. (3)</p> <p>123. Education of Exceptional Children. (3)</p> <p>124. Educational Characteristics of Mental Retardation. (3)</p> <p>126. Physical Education for the Mentally Retarded. (3)</p> <p>127. Psychology of Learning. (3)</p> <p>128. Camping for the Mentally Retarded. (3)</p> | <p>130. Education of the Hearing Impaired. (3)</p> <p>131. School Curriculum for the Hearing Impaired. (3)</p> <p>181. Psychometrics. (5)</p> <p>184. Curriculum for the Mentally Retarded (Trainable). (3)</p> <p>185. Arts and Crafts for the Mentally Retarded. (3)</p> <p>186. Diagnosis and Treatment of Learning Difficulties. (3)</p> <p>187. Curriculum for the Mentally Retarded (Educable). (3)</p> <p>191. Student Teaching in Special Education. (3, 6, 9)</p> <p>192. Field Experiences with Exceptional Children. (Arr)</p> <p>193. Psychopathology of Childhood. (3)</p> <p>194. Education of the Multiple Handicapped. (3)</p> <p>195. Community Relations. (3)</p> <p>200. Principles of Learning in Teaching. (3)</p> <p>202. Psychology of Adolescence. (3)</p> <p>213. Diagnosis of Reading. (3)</p> <p>214. Methods of Instruction in Remedial Reading. (3)</p> <p>216. Practicum in Remedial Reading. (3)</p> <p>224. Mental Retardation: Etiology and Treatment. (3)</p> <p>225. Characteristics and Education of the Gifted Child. (3)</p> <p>225. Improvement of Reading in the Elementary School.</p> <p>225. Sociology of Deviant Behavior. (3)</p> <p>235. Theory and Practice of Play Therapy. (3)</p> |
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¹In College of Education

238. Practicum in Play Therapy. (2)
261. Organization and Administration of Special Education. (3)
266. Applied Research in Education. (3)
267. Research in Psychology and Education. (3)
282. Individual Diagnostic Intelligence Testing. (3)
283. Readings and Conferences. (Arr)
285. Research and Thesis Writing. (Arr)
286. Curriculum and Methods for Gifted Children. (3)
287. Basic Problems in Teaching the Mentally Handicapped. (3)
288. Counseling and Guidance of Parents of Exceptional Children. (3)
289. Diagnosis of the Mentally Retarded. (3)
290. Education for Mental Health in the Classroom. (3)
291. Identification of the Emotionally Handicapped. (3)
292. Education of Emotionally Disturbed Children (Elementary Age). (3)
293. Education of the Socially Maladjusted. (3)
294. Seminar in Special Education. (3)
295. Methods in Presenting Literature to the Gifted. (3)
296. Problems and Methods in Compensatory Education. (3)
297. Seminar on Disadvantaged Children. (3)
298. Vocational Habilitation for the Mentally Retarded. (3)
299. Teaching Language to the Disadvantaged. (5)
385. Field Studies and Thesis. (Arr)
400. Continuing Registration. (3)

¹Department of

Speech

Head: Rex E. Robinson, PhD, University of Wisconsin

Office: Main 33

Degrees offered: MS, MA

The Department of Speech offers a Master of Science degree and the Master of Arts degree in the following fields: Interpretation, Public Address, and Broadcasting.

Graduate students taking Speech courses in the 100 series, usually taken by upper division students, will be expected to present additional projects at the option of the instructor.

Speech Courses

107. Speech Improvement in the Elementary Classroom. (3)
- **109. Discussion and Conference Leadership. (3)
110. Play Reading. (3)
111. Psychology and Semantics of Speech. (3)

117. Persuasion. (3)
123. Teaching of Speech. (3)
124. Advanced Interpretation. (5)
125. Speech Composition. (5)
133. Directing Forensic Programs. (3)
181. Television Production. (3)
184. Educational Broadcasting. (3)
185. Advanced Radio-TV Production. (Arr)
186. Radio and Television Training. (1-5)
190. Problems in Speech. (Arr)
201. Thesis. (2-5)
210. Graduate Methods: Speech. (2)
224. Seminar in Oral Interpretation. (2)
225. Seminar in Rhetorical Theory. (2)
230. Seminar in Radio and Television. (2)
235. Seminar: British-American Oratory. (2)
400. Continuing Graduate Advisement.

¹In College of Humanities and Arts

**Taught 1971-72

¹*Department of*

Theatre Arts

Head: Floyd T. Morgan, MA, State University of Iowa; doctoral work,
State University of Iowa and Stanford University

Office: Fine Arts Center 232

Degrees offered: MA, MFA

Theatre Arts offers advanced work leading to the Master of Arts and Master of Fine Arts degrees. The graduate program in Theatre Arts prepares the student for work in educational and nonprofessional theatres. It offers training and experience in Playwriting, Directing, Acting, Designing, and Advanced Technical Practice.

During the first quarter of residence, and before admission to candidacy for either the MA or the MFA degree, the candidate is required to take two diagnostic and program planning examinations given by the Theatre Arts staff. The first of these is a comprehensive written examination covering Theatre History, Literature and Criticism, Acting, Directing, Scenery and Costume Design, Lighting, Make-Up, Technical Practice, Current Drama and Theatre. The second examination is an oral skills test in which the student demonstrates before a departmental committee his competency in voice and diction, extemporaneous speaking, and interpretative reading or acting. The results of these examinations are used to assist the student and his faculty adviser in planning a program of study and in selecting a thesis subject or creative project.

The candidate for the MA degree may, with the approval of his supervisory committee, present a thesis or a thesis alternate. The candidate for the MFA degree pre-

sents a creative project in Playwriting, Directing, Acting, Design, or Advanced Technical Practice. As part of the creative project and in lieu of a thesis, this candidate submits an original long play or its equivalent, a production book or a project portfolio.

Theatre Arts Courses

- 100, 102, 104. History of Theatre and Drama. (4, 4, 4)
- 106. Current Drama. (3)
- 120. Fundamentals of Design for the Theatre. (2)
- 124. Theatre Practice. (1)
- 144. Advanced Acting. (3)
- 146. Directing. (3)
- 148. Private Instruction. (Arr)
- 150. Scene Design. (3)
- 151. Historic Costume for the Stage. (3)
- 152. Stage Costuming. (3)
- 153. Costume Design. (3)
- 154. Stage Lighting. (2)
- 156. Theatre Organization and Management. (2)
- 158. Creative Dramatics. (2)
- 160. Playwriting. (3)
- 190. Problems in Drama. (Arr)
- 192. Projects in Theatre. (Arr)
- 194. Problems of Drama Directors. (3)
- 196. Advanced Directing. (3)
- 200. Seminar in Drama. (Arr)
- 201. Dramatic Theory and Criticism. (3)
- 202. Research Studies. (Arr)
- 204. Thesis. (Arr)
- 292. Advanced Projects in Theatre. (Arr)
- 400. Continuing Graduate Advisement. (3)

¹In College of Humanities and Arts

¹Department of

Veterinary Science

Head: Merthyr L. Miner, DVM, Iowa State University; postdoctoral work, University of Minnesota

Office: Veterinary Science 105

Degree offered: PhD (Interdepartmental Toxicology)

Courses listed are to strengthen the graduate curriculum in Nutrition, Breeding, Biochemistry, Parasitology, Bacteriology, and Toxicology. Understanding of comparative pathology and the reaction of various animal species to disease agents, both infectious and non-infectious, is important in these fields of study.

¹In College of Agriculture

Veterinary Science Courses

- *140. Veterinary Parasitology. (5)
- 142. Reproductive Physiology of Domestic Animals. (3)
- 143. Artificial Insemination in Domestic Animals. (1)
- 195. Pharmacology. (5)
- 200. Special Problems. (Arr)
- 210. Research. (Arr)
- **230. General Pathology. (5)
- **231. Systematic Pathology. (5)
- *232. Toxicologic Animal Pathology. (5)
- 242. Advanced Reproductive Physiology. (4)
- 270. Toxicology Seminar. (1)
- 280. Toxicology. (5)
- 400. Continuing Graduate Advisement. (3)

*Taught 1970-71

**Taught 1971-72

²Department of

Wildlife Resources

Head: William F. Sigler, PhD, Iowa State University

Office: Forestry-Zoology 163

Degrees offered: MS, PhD

The department offers research opportunities in many areas of terrestrial and aquatic ecology and animal behavior in addition to problems dealing more directly with wildlife conservation. These lead to MS and PhD degrees.

The department operates or has access to the following research facilities: a large new aquarium facility operated as an aquatic toxicology and physiology labora-

tory, the Bear Lake Biological Laboratory, a new experimental fish hatchery, a river studies laboratory area, a radioecology and behavior laboratory, and behavior and ecology research facilities at Green Canyon.

Assistantships. The Utah Cooperative Wildlife Research Unit and the Utah Cooperative Fishery Unit provide research assistantships for graduate students in the department. The department has

²In College of Natural Resources

two teaching assistantships and numerous research assistantships supported by research grants from state, federal, and private agencies. Applications for assistantships should be directed to the head of the department.

Wildlife Extension. The department has a program in Wildlife Extension in cooperation with the Extension Service and the Utah State Department of Fish and Game.

Wildlife Resources Courses

- 131. Management of Wildlife Habitat. (3)
- 132. Management of Wildlife Populations. (4)
- 133. Management Aspects of Wildlife Behavior. (3)
- 145. Principles of Wildlife Management. (3)
- 148. Animal Behavior. (4)
- 150. General Wildlife Management. (5)
- 154. General Fishery Biology. (5)
Icthyology (Zoology 155). (5)
- 155. Economic Wildlife. (3)
- 156. Radiation Ecology. (3)
- 158. Wildlife Seminar. (1)
- 159. Diseases of Fish. (2)

- 160. Animal Ecology. (5)
- 161. Limnology. (4)
- 162. Fishery Biology. (4)
- 163. Instrumental Ecology. (3)
- 165. Fishery Principles. (4)
- 166. Aquatic Ecology. (3)
- 167. Principles of Fish Culture. (3)
- **168. World Fishery Resources. (3)
- 169. Fishery Techniques. (4)
- 172. Problem Orientation. (3)
- 175. Wildlife Law Enforcement. (3)
- 210. Advanced Field Problems. (1-5)
- 248. Analysis of Animal Behavior. (4)
- 253. Advanced Big Game Management. (3)
- 257. Graduate Seminar. (1)
- 260. Ecology of Animal Populations. (4)
- 261. Pollution Biology Seminar. (4)
- *262. Fish Population Theory. (5)
- 270. Research and Thesis. (1-15)
- 280. Seminar in Animal Populations. (1)
- 281. Aquatic Environmental Interactions. (1)
- 282. Seminar in Animal Behavior. (1)
- 400. Continuing Graduate Advisement. (3)

*Taught 1970-71

**Taught 1971-72

¹Department of

Zoology

(Zoology, Entomology, Physiology)

Head: Datus M. Hammond, PhD, University of California; postdoctoral work, University of Munich and University of Bonn

Office: Forestry-Zoology 117

Degrees offered: MS, PhD

Master of Science Degree. The Zoology Department offers an MS degree in various phases of Agricultural Entomology, Genetics,

Medical Entomology, Systematic Entomology, Physiology, Parasitology, Mammalogy, Ornithology, and Herpetology.

¹In College of Science

Doctor of Philosophy Degree. Cooperatively with related departments, advanced study and research is offered for the attainment of the PhD degree in specialized fields of Zoology, Entomology, and Physiology. Further information may be obtained from the department.

A training program in Genetics sponsored by a grant from the National Institutes of Health is now being conducted; research fellowships are offered in connection with this program.

Zoology Courses

- 101. Invertebrate Zoology.
- 107. History and Literature of Biology. (3)
- 112. Principles of Genetics. (5)
- 116. Parasitology. (5)
- 118. Vertebrate Embryology. (5)
- 119. Comparative Anatomy. (5)
- 121. Ornithology. (4)
- 122. Mammalogy. (4)
- 123. Field Zoology. (4)
- 127. Cytology. (5)
- 128. Elements of Histology. (5)
- 129. Histological Technique. (3)
- 132. Mechanics of Evolution. (5)
- 150. Herpetology. (4)
- 155. Ichthyology. (5)
- 201. Special Problems. (Arr)
- 205. Orientation for Graduate Students. (1)
- 207. Theoretical Biology. (3)
- *211. Genetics of Lower Organisms. (3)
- **212. Biochemical Genetics. (3)
- *214. Current Topics in Genetics. (3)
- **215. Genetics of *Drosophila* and Maize. (3)
- 224. Biological Electron Microscopy. (3)
- **225. Advanced Topics in Morphogenesis. (3)
- 233. Zoogeography. (3)
- 235. Protozoology. (4)
- 236. Advanced Parasitology. (2)
- 240. Research and Thesis. (Arr)
- 261, 262. Seminar in Vertebrate Zoology. (1, 1)
- 271, 272, 273. Seminar in Genetics. (1, 1, 1)

- 281, 282, 283. Seminar in Parasitology. (1, 1, 1)
- 291, 292, 293. Seminar in Developmental Biology. (1, 1, 1)
- 400. Continuing Graduate Advisement. (Arr)

Entomology Courses

- 100. Systematic Entomology. (3)
- 101. Principles of Animal Taxonomy. (2)
- **105. Forest Entomology. (4)
- 108. Economic Entomology. (5)
- 111. Principles of Entomology. (3)
- 112. Principles of Entomology. (5)
- 113. Principles of Entomology. (5)
- 115. Medical and Veterinary Entomology. (4)
- *120. Insect Pollination in Relation to Agriculture. (2)
- **130. Nematology. (3)
- 138. Aquatic Entomology. (3)
- **202. Advanced Systematic Entomology. (2)
- **206. Insect Ecology. (3)
- **207. Insect Ecology Laboratory. (2)
- 210. Special Problems. (Arr)
- *212. Advanced Insect Physiology. (5)
- *213. Insecticide Toxicology. (5)
- **231. Biological Control of Insect Pests. (3)
- 250. Research and Thesis. (Arr)
- 261, 262, 263. Seminar in Entomology. (1, 1, 1)
- 400. Continuing Graduate Advisement. (Arr)

Physiology Courses

- 104. Advanced Human Physiology. (5)
- 121, 122. Mammalian Physiology. (5, 5)
- 130. Cellular Physiology. (5)
- 141. Endocrinology. (4)
- 142. Reproduction in Domestic Animals. (3)
- 151. Comparative Physiology. (5)
- 242. Advanced Reproductive Physiology. (4)
- 253. Ecological Vertebrate Physiology. (5)
- 261. Physiology of Response. (3)
- 271, 272, 273. Readings in Physiology. (1, 1, 1)
- 281, 282, 283. Seminar in Physiology. (1, 1, 1)
- 291. Research and Thesis. (Arr)
- 400. Continuing Graduate Advisement. (Arr)

*Taught 1970-71

**Taught 1971-72

Summer Quarter

Director: Ellvert H. Himes, PhD, University of Utah

Office: Main 130

Quarter: June 15-August 21, 1970

First Session — June 15-July 17

Second Session — July 20-August 21

The Summer Quarter at USU is more than just the fourth quarter of the University's program of academic and cultural offerings. It is unique in that special programs are devised for early admission to the University, continuing undergraduate education, and significant professional advancement in specialized fields of endeavor.

The Summer Quarter is a 10-week period, like other quarters. It is divided into two sessions of five weeks each. It provides for numerous short workshops, seminars, clinics, and institutes. The graduate student may complete requirements for a Master's degree in three summers; the doctoral candidate will find rich selection to supplement a high-level program.

Numerous challenges and cultural advantages are offered during the Summer Quarter. Recitals, concerts, dramas, and special lectures encourage individuals of all ages in creative work and development of individual talents.

The highly qualified resident

faculty of USU is augmented in the summer by distinguished visiting professors of national and international reputation.

A distinguishing feature of the Summer Quarter is the carefully planned program of recreational enrichment. The Coordinator of Student Activities supplies all students opportunities in their various interest fields for out-of-class activities on a regularly scheduled basis. University-wide programs are planned that provide activities in the University Center on campus, and in the coolness and convenience of the nearby canyons. Contests and tournaments, games, movies, dances and parties, supervised tours and hikes are conducted by the Center. The Center also supplies numerous outlets for snacks and relaxation.

The location of USU, with its climate and scenic canyons, nearby national parks and monuments, provides special inducements for comfortable and enjoyable study for collegiate education at all levels.

Research Programs

D. Wynne Thorne, Vice President for Research; Chairman of Board, USU Foundation

K. W. Hill, Director, Agricultural Experiment Station

Clayton Clark, Director, Center for Aeronomy Research

Clayton Clark, Director, Engineering Experiment Station

Doran J. Baker, Director, Electro-Dynamics Laboratory

Jay M. Bagley, Director, Utah Water Research Laboratory

D. F. Peterson, Chairman, Utah Center for Water Resources Research

Bartell C. Jensen, Associate Director, Economics Research Center

John M. Neuhold, Director, Ecology Center

John M. Neuhold, Acting Director, Center for Pollution Research

Phyllis Snow, Director, Institute for Research on Man and His Personal Environment

James P. Shaver, Chairman, Bureau of Educational Research

John D. Hunt, Chairman, Institute for the Study of Outdoor Recreation and Tourism

E. Paul Hullinger, Director, Office of Program Development and Director, USU Foundation

Jessop B. Low, Leader, Utah Cooperative Wildlife Research Unit

Robert H. Kramer, Leader, Utah Cooperative Fishery Unit

Phillip Barker, Leader, Utah Cooperative Forest Recreation Research Unit

J. A. Emenhiser, Director, Bureau of Government and Opinion Research

USU was among the first of the colleges and universities in the intermountain area to have a research program. Originally the research was principally in agriculture. Now research projects are in every college and almost every department of the University.

Research is closely associated with teaching and student activities. Most of it is conducted by staff members who are also employed to teach part of their time.

Many graduate students are employed to assist in research. The experience thus gained by students is an important part of their education.

Research affiliated with the University is under the general

administration of the Vice President for Research. Actual research operations are in several organizations. A more detailed discussion of the principal organizations and areas of research can be found in the University General Catalog.

The College of Engineering conducts an extensive program of research in the various departments through the Engineering Experiment Station. There are a number of well-equipped laboratories whose programs are well financed. These include the Utah Water Research Laboratory, the Electro-Dynamics Laboratories, the Radio Propagation Laboratory, and the Stewart Radiance Laboratory at Bedford, Massachusetts.

Policies on research and requests for support are reviewed by the University Research Council. Present members of the council and the area each represents are: Wynne Thorne, Chairman; R. Gaurth Hansen, Eldon J. Gardner, ex-officio members; Vearl R. Smith, Agriculture; Gary Hansen, Business; James P. Shaver, Education; Clayton Clark, Engineering; Phyl-

lis Snow, Family Life; Austin Fife, Humanities and Arts; F. H. Wagner, Natural Resources; Ralph M. Johnson, Science; Wade H. Andrews, Social Sciences; Kenneth W. Hill, Agricultural Experiment Station; Jay M. Bagley, Utah Water Research Laboratory; Doran J. Baker, Electro-Dynamics Laboratory; and John M. Neuhold, Ecology Center.

Extension Services

Director: W. H. Bennett, PhD, University of Wisconsin
Office: Agricultural Science 221

Lloyd A. Drury, Associate Director; EdD, University of Wyoming
Lloyd R. Hunsaker, Associate Director; PhD, University of Minnesota
Marden Broadbent, District Director (Provo); PhD, University of Wisconsin

William F. Farnsworth, District Director (Logan); PhD, University of Wisconsin

Wayne B. Ringer, Director, Conference and Institute Division

Utah State University's Extension Services include four divisions — Cooperative Extension Service, Extension Class, Conferences and Institutes, and Independent Study (correspondence).

Through its Extension Class Division, the University Extension Services offers numerous graduate courses in selected centers over the state. These permit students to progress in advanced degree programs preparatory to completing

requirements in residence on the Logan campus. These services are fully accredited by the National University Extension Association.

District offices at Logan and Provo, area offices at Salt Lake City and Richfield and county offices in all of the counties, except Daggett and Grand, are centers of service. Here students may obtain catalogs, class schedules, graduate forms and other information.

International Programs

Director, International Programs: J. Clark Ballard, PhD, Cornell University

Office: Library 202

Daryl Chase, President Emeritus, Chairman of Board of Governors, Center for the Study of the Causes of War and Conditions for Peace; PhD, University of Chicago

Bruce H. Anderson, Coordinator, Inter-American Center for the Integral Development of Water and Land Resources, Merida, Venezuela; DEngr, University of California

B. Austin Haws, Project Director, USU-USAID Team in Bolivia; PhD, Iowa State University

Glen E. Stringham, Project Director, Incora-USU team in Colombia; PhD, Colorado State University

LeRoy A. Blaser, Chairman, East-West Institute; EdD, University of California

USU has a cosmopolitan campus with more than 500 students from 50 foreign countries in attendance. More than half of these international students are working on advanced degrees.

USU is directing its major international programs toward Latin America, although assignments are being pursued in other parts of the world by USU faculty members. Other educational programs designed to further international understanding include: the Center for the Study of the Causes of War and the Conditions for Peace, the East-West Institute, an Analytical Study of USAID University Projects, and Peace Corps Training projects.

The Center for the Study of the Causes of War and Conditions for Peace was established to focus the attention of the academic community on the issues and ideas contained in man's ageless search for peace. This center serves to stimulate research studies, to assemble a comprehensive library of books and periodicals relating to the causes of war and conditions for peace, to provide a meaningful dia-

logue between scholars and leaders in the various areas of international relations, to publish papers relating to the purposes of the center, and to utilize the processes of education to promote the peaceful ordering of human affairs. The center sponsors an annual convocation, graduate and undergraduate classes, and periodic seminars and institutes.

Graduate students from USU have participated in several of the USU projects in Brazil, Bolivia, Venezuela, and Mexico. For example, one Master's candidate completed course work on the Logan campus learning techniques which he later applied to a llama study in Bolivia. His thesis research in South America was aided by a Bolivian who had completed requirements for a PhD in Animal Science at USU.

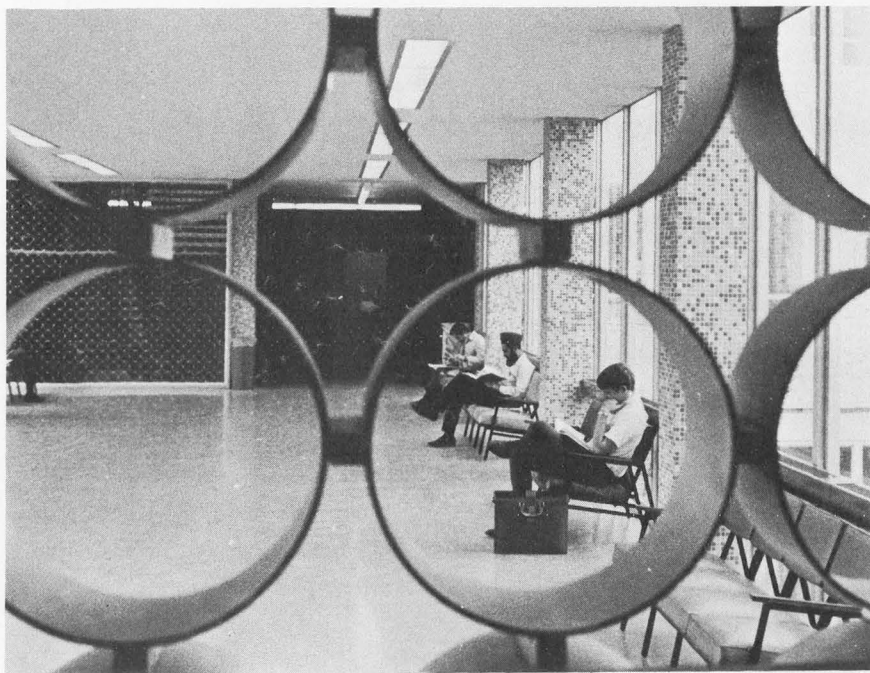
Three levels of planners and implementers, including top government officials, are trained at the Inter-American Center for the Integral Development of Water and Land Resources. This center (commonly known in Latin America as CIDIAT) is operated for the Or-

ganization of the American States by USU in cooperation with the University of the Andes. In addition to conducting courses at Merida, Venezuela, for leaders from the 23 member nations of the OAS, the CIDIAT faculty teaches a series of national training courses in various member countries on request. Graduate students from USU have also been associated with the CIDIAT program in conducting community development studies for Master's theses.

Seven NDEA Spanish Language Institutes have been conducted by USU faculty to give high school Spanish teachers advanced training in the Spanish language and tech-

niques in teaching it. USU also has cultural exchange programs such as *Spring Quarter in Mexico* conducted in conjunction with the University of the Americas in Mexico City, and a traveling workshop for graduate and undergraduate art students known as *Utah-Spring-Mexico*.

A high percentage of the approximately 500 Peace Corpsmen who have been trained at USU held Bachelor's degrees before entering the Peace Corps. Four of the nine groups were trained for South American countries and four for Iran, where USU maintained formal contracts for 13 years.



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Director, Agricultural Experiment Station: Kenneth W. Hill

Director, Computer Center: Wendell L. Pope

Director, Ecology Center: John Neuhold

Director, Electro-Dynamics Laboratories: Doran J. Baker

Director, Engineering Experiment Station: Clayton Clark

Director, Utah Water Research Laboratory: Jay M. Bagley

Vice President, Extension Services and Continuing Education:

J. Clark Ballard

Associate Director, Continuing Education: Lloyd A. Drury

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Colleges

<i>College</i>	<i>Dean</i>
Graduate Studies (School of)	Eldon J. Gardner
Agriculture	Vearl R. Smith
Business	Robert P. Collier
Education	Oral L. Ballam
Engineering	Dean F. Peterson, Jr.
Family Life	Phyllis R. Snow
Humanities, Arts and Social Sciences	M. Judd Harmon
Natural Resources	Thadis W. Box
Science	Ralph M. Johnson

Departments of Instruction

<i>Department</i>	<i>Head</i>
Accounting	Norman S. Cannon
Aerospace Studies	Ralph F. Jackson
Agricultural Education	Gilbert A. Long
Agricultural and Irrigation Engineering	A. Alvin Bishop
Animal Science	James A. Bennett
Applied Statistics and Computer Science	Rex L. Hurst
Art	Harrison T. Groutage
Bacteriology and Public Health	Rex S. Spendlove
Botany	Orson S. Cannon
Business Administration	Howard M. Carlisle
Business Education and Office Administration	Theodore W. Ivarie
Chemistry	Garth L. Lee
Civil Engineering	Elliot Rich
Clothing and Textiles	Anne P. Kernalguyen
Communicative Disorders	Jay R. Jensen
Dairy Science	George E. Stoddard
Economics	Reed R. Durtschi
Educational Administration	Charles O. Ryan
Electrical Engineering	Bruce O. Watkins
Elementary Education	Kenneth C. Farrer
English and Journalism	T. Y. Booth
Family and Child Development	Don C. Carter

<i>Department</i>	<i>Head</i>
Food and Nutrition	Ethelwyn B. Wilcox
Food Science and Industries	C. A. Ernstrom
Forest Science	Lawrence S. Davis
Geology	Clyde T. Hardy
Health, Physical Education and Recreation	H. B. Hunsaker
History	William F. Lye
Home Economics Education	Gwen B. Biddulph
Household Economics and Management	Edith Nyman
Industrial and Technical Education	Neill C. Slack
Instructional Media	Lester C. Essig
Landscape Architecture and Environmental Planning	Burton Taylor
Languages and Philosophy	L. Grant Reese
Manufacturing Engineering	Carl D. Spear
Mathematics	Lawrence O. Cannon (acting)
Mechanical Engineering	Russell M. Holdredge
Military Science	M. R. McCarthy
Music	Max F. Dalby
Physics	W. Farrell Edwards
Plant Science	Frank B. Salisbury
Political Science	JeDon A. Emenhiser
Psychology	Heber C. Sharp
Range Science	Cyrus M. McKell
Secondary Education	Kenneth C. Farrer
Sociology, Social Work and Anthropology	Therel R. Black
Soils and Meteorology	R. L. Smith
Special Education	Marvin G. Fifield
Speech	Rex E. Robinson
Theatre Arts	Floyd T. Morgan
Veterinary Science	Merthyr L. Miner
Wildlife Resources	William F. Sigler
Zoology	Datus M. Hammond

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Alphabetical Listing of Key Offices and Buildings

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CAMPUS MAP
UTAH STATE UNIVERSITY
LOGAN, UTAH

